ENGINEERING

Lindsay Tells Why Inside Liners of Refrigerator Should Be Vented

Dry-Zero Corp.
Merchandise Mart
Chicago, Ill.

Dear Mr. Cockrell:

I enjoyed very much hearing from you as you generally have something pertinent, definite, and interesting about the development of the industry in which I am so keenly interested. I will try and answer your inquiry "Why should the inside liner of a refrigerator have holes in it?" as simply and untechnically as I can.

First, let me make this important qualification. Holes or "vents" in the liner, which lead from the insulation space to the food chamber of the refrigerator, are definitely desirable only if the insulating material is non-hygroscopic, i. e.; refuses to absorb moisture (like wax or duck feathers). If the insulation is not of the character then these holes or "vents" are definitely undesirable.

Here are the reasons:

The air we breathe is composed principally of two things: air and water vapor. This water vapor is much the thinnest of the gases composing the atmosphere.

For definite scientific reasons the moment we materially change the temperature on two sides of a wall, a definite pressure from the warm to the cool side is immediately exerted on this water vapor but not on the other gases composing the air.

This pressure is sufficient to force the water vapor gas quite readily through the welded seams, crevices, and even the porposity of the outside shell of a refrigerator. Let me stop a moment here to point out that there is no electric refrigerator shell made so tight that it would maintain a vacuum any length of time; how then could we expect to keep out a gas twice as thin as air? It cannot be done, as is daily clearly proven.

Very well, we now have the water vapor getting through the outside shell and into the insulation space in spite of so-called moisture seals (which only seal against water—a totally different thing). This water vapor having penetrated the wall immediately goes over to the cold side and strikes the bold but relatively inpenetrable one-piece porcelain enameled liner. The result is condensation on the liner.

We now reach the point where the nature of the insulation becomes wholly important. If it is hygroscopic (as all the cheap insulants are) neither you, I, nor Tom, Dick, or Harry, can prevent that condensed moisture (now water) being absorbed slowly into the hygroscopic insulation, which will inevitably become damp and wet.

But if the insulant is non-hygroscopic the water will finally trickle down the liner and if the bottom of the shell is water-tight will form a puddle there, *leaving the insulation, however, perfectly dry.*

Now, go back in your mind through this cycle of inevitable effects, and suppose that we have a non-hygroscopic insulation and, further, have small holes through the liner (for example, don't gasket the hooks or knobs supporting the shells), then is it not obvious that the same vapor pressure force that drives this gas through the minute crevices of the outside shell will readily drive it through these holes to the point where the pressure ceases, namely; the cold refrigerating coils?

This is exactly what happens and we are demonstrating it at the Dry-Zero Laboratory.

However, if we had a hygroscopic insulant, we can only dehydrate (keep dry) relatively tiny portions of the material which are right next the venting holes. It is very easy to demonstrate this optically. It has been done again and again for the disbelievers. Hence, "venting," as this method of keeping the insulation dry, is called, is impracticable, indeed impossible, unless we use a non-hygroscopic insulant.

There is the picture in the simplest language I can describe it. As a technical man I realize that I should eludicate the reasons for each step and fortify with the immense amount of experimental test work which has been done to prove the causes for the results shown, but I can appreciate that I have to sink such desires in the necessity of making the subject as simple as possible and the actual facts as easily grasped by your readers as I can.

If there is any point in this simple sequence that does not seem clear to you, let me know and I will be delighted to carry you further into the complex details and causes of the fairly simple factual results outlined.

HARVEY B. LINDSAY,
President.

5 Makes of Refrigerators Exhibited at Show

ARCATA, Calif.—A four-day display of five makes of refrigerators was held by the Pacific Gas & Electric Co. in the utility's display room. Demonstration of the units was made by Mrs. Phil Barry (of Eureka, Calif.,) and Ward Schaffer of the utility.

Valve's Function in Load Compensation Explained by Chapin

BOSTON—The snap-action, positive-sealing temperature control valve designed by the Barostat Co. is designed to effect load compensation in a refrigeration system by providing a simultaneous reduction of average refrigerant temperature, thereby minimizing the variation in box or beverage temperature, declares B. L. Chapin, vice president of the Barostat Co.

Each cycle of this valve's operation, says Mr. Chapin, comprises an active and inactive period, the relative duration of the active period depending directly upon the refrigerating load.

For a typical cycle, the refrigerant temperature varies as shown in Fig. 1.

In this example, the total range of refrigerant temperature is 30° F., and the average for the active period is 10° F. above the minimum—for the inactive, 10° F. below the maximum.

As the refrigerating load increases the average refrigerant temperature for the full cycle decreases. For example:

Load B.t.u./Hour	Operating Cycle Active Period	Operating Cycle Inactive Period	Average Refrigerant Temperature Active Period	Average Refrigerant Temperature Inactive Period	Average
50	5%	95%	0.05×15	$+ 0.95 \times 25$	$= 24.5°$ F.
100	10%	90%	0.10×15	$+ 0.90 \times 25$	$= 24.0°$ F.
200	20%	80%	0.20×15	$+ 0.80 \times 25$	$= 23.0°$ F.
500	50%	50%	0.50×15	$+ 0.50 \times 25$	$= 20.0°$ F.

*Load figures are based on compressor capacity of 1,000 B.t.u.'s per hour.

Mr. Chapin points out that for the 500 B.t.u. load the average refrigerant temperature is 4.5° F. lower than for the 50 B.t.u. load. In space cooling applications, he advises, this decrease in refrigerant temperature largely offsets the increase in temperature differential between box and refrigerant and provides substantially constant box temperature over wide variations in load.

In liquid coolers, he declares, this characteristic insures satisfactory beverage temperature at full load without danger of freeze-up during long no-draft periods.

Mr. Chapin claims that the slow-acting temperature control valve, in contrast, causes the refrigerant temperature to increase as the load increases, thereby aggravating the variation of box or beverage temperature. Reason for this, he says, is that the slow-acting valve has no active and inactive periods—the greater the load, the wider the valve opening required to discharge the gas, and since the only way to increase the valve opening is to raise the refrigerant pressure, resulting in a higher refrigerant temperature.

Fig 2 shows an application of a Barostat valve in conjunction with an equalizer reservoir to eliminate compressor short cycling in the operation of a direct contact liquid cooler, or other equipment of low thermal storage capacity.

The valve is adjusted for the operating pressure and differential desired for the cooling element. For sulphur dioxide this might be open at 12 lbs. and closed at 5 lbs.

The compressor switch is adjusted to cut in somewhat below the valve setting, say at 7 lbs. pressure, and to cut out at a low value, say 15 inches of vacuum. The valve then operates as often as the load on the liquid cooler requires (frequently every time a glass of beverage is drawn), discharging the refrigerant gas into the reservoir. The hand valve or restricting orifice in the Barostat valve discharge prevents valve flutter.

Eventually, the pressure in the reservoir builds up to the cut-in setting of the compressor, which then runs for a reasonable length of time, sufficient to reduce the reservoir pressure to the cut-out point.

The adjustable differential feature of the Barostat valve aids in this set-up by allowing accurate setting in the field, states Mr. Chapin.

In the construction of the Barostat valve, the resilient bronze diaphragm forms the top of the pressure chamber and responds to increase or decrease of refrigerant pressure by buckling upward or downward, thereby providing the inherent snap action.

No refrigerant reaches the air space above the diaphragm, which space houses the pressure adjusting mechanism. The loading spring and screw supply a precisely adjustable force, which is transmitted through the loading plate and cushion as a uniform pressures over the resilient diaphragm. The retainer serves to confine the loading cushion and to protect the resilient diaphragm against excessive refrigerant pressure—for example, when the refrigerating equipment is shut down.

In the refrigerant pressure chamber below the diaphragm the valve stem, urged upward by the comparatively light valve lifting spring, follows the motion of the resilient diaphragm, which in its downward (low pressure) portion forces the valve stem against its seat.

The reaction of the seated valve produces a small dimple at the center of the diaphragm, sufficient to absorb the slight preliminary creep of the diaphragm as the pressure gradually rises toward the opening point. It is this dimple which maintains up to the very instant of opening a substantial force on the seated valve and insures positive seal.

The dimple is adjustable. By removing the sealing plug at the bottom and turning the squared adjustment stem (stuffing box seal) the valve stem is rotated within the threaded valve stem nut, increasing or decreasing the depth of the dimple. Turning clockwise raises the opening pressure without affecting the closing pressure, thereby providing independent adjustment of differential.

Refrigerant Temperature Variations

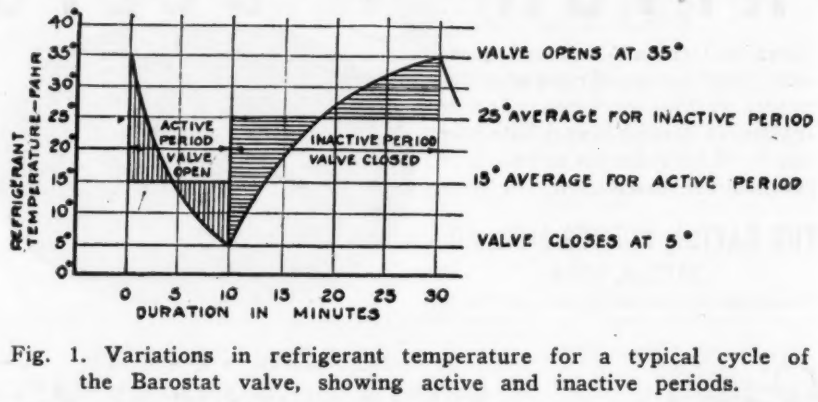

Fig. 1. Variations in refrigerant temperature for a typical cycle of the Barostat valve, showing active and inactive periods.

Application of Barostat Valve

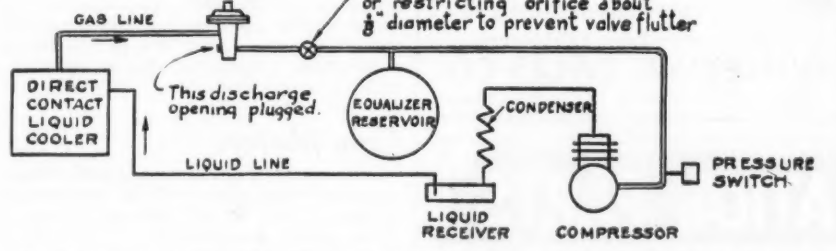

Fig. 2. Application of a Barostat valve in conjunction with an equalizer reservoir to eliminate compressor short cycling in operation of a direct contact liquid cooler, or other equipment of low thermal storage capacity.

100 Refrigerators Sold in First Week by Using Radio Coin Meters

CHICAGO—Over 100 electric refrigerators were sold by Davis Store, Leonard dealer here, during the first week of the establishment of the "Len-O-Meter," radio meter sales plan sponsored by Leonard Refrigerator Co.

The plan gives a four-tube a.c. or d.c. radio with each refrigerator. Fifteen cents a day is put in the meter. The radio will not play nor the refrigerator work unless at least this amount is put in each day. After three years, when payments are completed, the customer has a kitchen radio.

When bought for cash or on the regular 6 per cent carrying charge, the Len-O-Meter radio is not included in the purchase.

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ELECTRIC REFRIGERATION NEWS

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Milwaukee Distributors Fight Price Cutting as Dealers Hit Sales Slump

Sales Ahead of Last Year, but Adverse Weather and Price Uncertainty Worry Retail Organizations

By T. T. Quinn

MILWAUKEE—Sales of electric refrigerators in Milwaukee and the nearby Wisconsin territory are running ahead of last year—but there are complications.

One of these complications is the recent attempt in the Wisconsin legislature to license dealers in refrigeration through the state's Industrial Commission (ELECTRIC REFRIGERATION NEWS, June 12). Milwaukee distributors feel that they've got that situation about licked.

The two other complications are somewhat related. There's a wave of price cutting, so vicious in some instances that dealers have been willing to accept a profit of only $5 in order to make a sale—and the weather man hasn't been doing much to help things along, either. Up to the middle of June, the city's share of warm weather has been so slight as to be almost negligible.

Worried by Price Cutting

Naturally, distributors and reputable dealers are worried over this price cutting situation. Where, they ask, will it eventually lead? And what is its effect going to be on Milwaukee—a territory moderately prosperous, rich in potentialities, solid in its buying (and paying) habits, but a bit backward in adopting new things?

The Wisconsin Radio, Refrigeration, and Application Association, under the leadership of F. W. Greusel, has been making a serious attempt to eliminate price cutting and its attendant evils. Mr. Greusel has been studying the codes of fair competition under which dealers in Kansas City and Cincinnati are operating, and is debating the advisability of a similar agreement for Milwaukee retailers.

Believe Code Would Fail

But, unless the basic conditions are changed, he is inclined to believe that such a code, dependent entirely on dealer cooperation, will fall flat.

When a dealer is desperate for sales, he's not apt to let a toothless agreement as to strict list prices stand in the way of additional business. If there were only some way to make a price agreement binding . . . but, Mr. Greusel is afraid, there isn't.

More of this later. First, in cold figures, just what is the situation in Milwaukee?

Saturation of the national market for electric refrigerators has been estimated at 28.2 per cent. Saturation of the Milwaukee market, according to a survey by the Milwaukee *Journal*, is 23.2 per cent. That puts the city just 5 per cent back of the national average. Some distributors will tell you it's closer to 10 per cent.

The *Journal* has just issued a survey of the Milwaukee market, which contains a lot of interesting information. Here are some excerpts, concerning refrigeration and allied fields:

Market saturation as of January, 1934, was 17.7 per cent, a difference of 5.5 per cent between last year's figures and this year's. This indicates, the *Journal* has estimated, that 10,169 electric refrigerators were sold in the greater Milwaukee area during last year.

There's a bit of disappointment, however, in the estimates for 1935. The survey revealed that only 3.9 per cent, or 7,207 persons, were planning to buy electric refrigerators this year.

Another interesting thing in the survey is in the field of ice refrigeration. 65.3 per cent of the city's residents are using ice at present, compared with 68 per cent a year ago, a decline in ice use of but 2.7 per cent.

More Using Refrigeration

In other words, while 10,169 more Milwaukeeans are using electric refrigerators than a year ago, only 4,973 less are using ice.

To the statistician, this means only one thing—the total number of homes in Milwaukee using refrigeration of one kind or another is increasing rather than decreasing, which in turn indicates that, in years past, most of the city was using no other refrigeration than that which nature furnished.

Home ownership in Milwaukee is high—42.1 per cent. And 1.2 per cent of the population is thinking seriously of buying or building this year.

Sixty-one per cent of the residents of greater Milwaukee own cars—but only 2.5 per cent of these are two-car families. There's one of the best insights one could have into the city's innate conservatism.

Milwaukeeans Save Their Money

Milwaukeeans make their money—and save it. They won't be stampeded or high-pressured into buying something they're not sure is going to go far toward paying for itself in long, economical service. And when they start out to buy, they have a pretty definite idea of what they want, and how much they want to pay for it.

This, then, is what Milwaukee refrigeration men are up against at the present time. Naturally cautious buyers, the Milwaukee public's hesitancy in accepting electric refrigeration, coupled with unfavorable weather conditions, has sent sales tail-spinning until dealers are slashing prices right and left in order to get what business there is available.

Price cutting is seldom a major factor in a busy market.

What Mr. Greusel, as head of the Wisconsin Radio, Refrigeration, and

(*Continued on Page 2, Column 1*)

Refrigeration Division Of Nema Meets July 8

NEW YORK CITY—The Refrigeration Sections of National Electrical Manufacturers Association will meet in Atlantic City July 8 and 9, report Nema officials. Sessions will be held at the Claridge Hotel.

The first day of the conference will be devoted to the commercial refrigeration section, and the second day to meetings of the household refrigeration group.

Servel, Inc., Declares $3.50 Semi-Annual Dividend

NEW YORK CITY—Directors of Servel, Inc., have ordered payment of the semi-annual dividend of $3.50 a share on the company's preferred stock, payable July 1 to stock of record June 20.

Chicago Air-Conditioning Standards Start Controversial Discussion At A.S.H.V.E. Convention

By Phil B. Redeker

TORONTO, Canada—Three hundred and thirty-three American Society of Heating and Ventilating Engineer members, and interested guests, delved into various phases of air conditioning, heard about the results of recent research in the field, and argued over "standards for certified air conditioning," at the semi-annual meeting of the Society held here last Monday through Wednesday.

Many new facts concerning the *performance* of various parts of typical air-conditioning systems were divulged at the technical sessions, and are reported in the air-conditioning section of this issue.

Among the subjects of the papers given were characteristics of grilles, an all-electric air-conditioning system, heat absorbing glass windows, air conditioning of an ale brewery, determination of air conditioning cooling loads, oil burning in residences, the dust problem in air conditioning, and Chicago standards for certified air conditioning.

Samuel R. Lewis, a past president of the A.S.H.V.E. and well-known for his published works on air conditioning, presented the Chicago standards for certified air conditioning at the final technical session, and precipitated a very lively discussion.

Most of the opposition to the set of standards centered on the clauses dealing with refrigeration, particularly the ones specifying the temperature of the air entering the room, the velocity of cooled air entering the room, and the pressure differences to be tolerated in the evaporator.

"It is apparent that these standards attempt to adapt refrigeration practices to heating and ventilating standards, instead of trying to adapt ventilating practices to some of the new developments in refrigeration," declared C. L. Toonder of the air-conditioning engineering division of Kelvinator Corp.

"How are you going to reconcile these standards with new data which indicates that air will be brought into the room through smaller ducts, at lower temperatures, and with higher velocities?

"Certified air conditioning will retard sales and progress in installing equipment which involves the latest developments in air-conditioning practice."

Another member declared that the engineers shouldn't attempt to set up standards "too quickly in the early development of the industry."

The proposed set of standards was defended by Harry Hart, another past president of the Society and a member of the committee drafting the code, on the grounds that "prospective purchasers of air conditioning are being scared off by the great discrepancy in bids, and they won't buy until some standards are set."

Mr. Lewis declared that while the committee had not intended to make the regulations on temperature differential too binding, they were all of the opinion that a temperature differential of 20° was the greatest that ought to be allowed.

Mr. Lewis warmly criticized the practice of boosting compressor speeds to get greater capacities, pointing out that a clause governing compressor speeds had been inserted to insure the user of getting a reasonable number of year's usage from the machine before it wore out.

According to Mr. Lewis, the standards for certified air conditioning were developed for the Chicago district by representatives of The Consulting Engineers Division of the

(*Continued on Page 5, Column 1*)

Utility Employees to Rent Refrigerators

ATLANTA—The Georgia Power Co. has inaugurated a new rental plan on the G-E "Liftop" refrigerator, in which employees of the company act as rental agents.

For a limited time, employees may rent to customers who use less than 35 kwh. per month the LK-1 G-E refrigerator.

For each one rented under the special contract, the employees will earn 50 cents per month for the first 12 months of rental, that is, a total of $6.00 per year. If they rent 10 refrigerators, they will increase their earnings by $5.00 a month for 12 months.

Chicago and Newark Utility Firms Report Increased Use of Air Conditioning This Year

NEWARK — The 123 air-cooling units installed in the first five months of this year in homes and buildings throughout the territory served by the Public Service Co. of New Jersey, showed an increase of 60 per cent as compared with the same period a year ago, utility officials report.

Approximately 4,250 persons attended the recent second annual New Jersey Air-Conditioning Show sponsored by the utility and manufacturers of air-conditioning equipment.

Exhibitors at the show included: Public Service Electric & Gas Co.; Blocker Air Conditioning Corp.; York Ice Machinery Corp.; Abbott Co.; North Jersey Air Conditioning Corp.; Frigidaire Sales Corp.; Krich Distributing Co.; Bryant Air Conditioning Corp.

Standard Air Conditioning, Inc.; North Jersey Ice Association; American Gas Products Corp.; Ilg Electric Mfg. Co.; Rock Wool Insulation Co. of New Jersey; John C. Fullerton, Inc.; Johns-Manville Corp.; Fox Furnace Co.

Surface Combustion Corp.; General Gas Light Co.; Reynolds Metals, Inc.; Minneapolis-Honeywell Regulator Co.; Elin, Inc., Newark; Bing & Fink, Inc.; Woolsulate Insulating Co.; New Jersey Society of Architects; New Jersey State Association of Master Plumbers. Inc.

CHICAGO—"To date in 1935 the connected horsepower added by air conditioning is double that of the same period in 1934," reported William P. Rock, air-conditioning division of the Commonwealth Edison Co. in Chicago.

Several chain stores are making installations in their Chicago outlets, he stated. Kresge, Andes Candy stores, Harmony cafeterias, and Florsheim shoe stores have signed contracts for air conditioning. Goldblatts have decided to air condition its new store. Several department stores have plans for air conditioning under consideration. Small theaters in outlying neighborhoods are rapidly adopting air conditioning.

Mr. Rock believes the most important achievement of the past years in the air-conditioning field was the introduction of the self-contained unit.

"This unit is air cooled, thereby requiring no water connections," he said. "It introduces outside air into the room and thereby provides outdoor ventilation.

"It is believed," Mr. Rock declared, "that the World's Fair was largely responsible for Chicago's having the greatest number of tons of refrigeration installed for air conditioning of any city in the country."

Knight C. Porter, also of the air-

(*Concluded on Page 9, Column 4*)

New Design Incorporated In Lipman Evaporators For Air Conditioning

BELOIT, Wis.—Recently added to General Refrigeration Sales Co.'s line of products is a series of air-conditioning low sides arranged for 5-, 7½-, and 10-hp. Freon machines.

Each low side consists of an evaporator, a thermostatic expansion valve, liquid line sight glass, liquid line filter, and a heat interchanger. Expansion valve and sight glass come connected to the evaporator, the filter and heat interchanger included as separate items.

Of interest in the design of these new low sides is the manner in which the problem of even refrigerant distribution has been met. The design, say Lipman engineers, has placed stress upon the necessity of controlling conditions on a physical basis involving the known action of the refrigerant under given conditions, rather than on a basis of fixed mechanical construction, incapable of adjusting itself to changing refrigerant conditions.

In the Lipman air-conditioning coil, a liquid line header is placed at the inlet of the evaporator. Fixed orifices lead from the header to the evaporator pipes. The header is kept full of liquid refrigerant at all times.

Because the bulb of the single thermostatic expansion valve is located on the heat interchanger in the suction line, the liquid is precooled before it reaches the liquid header. The pressure of this liquid is therefore constantly kept at a point *between* the head pressure and the evaporator pressure.

When the refrigerant gas leaving the evaporator becomes warm, it actuates the thermo expansion valve upon reaching the bulb in the heat interchanger. The valve opens wider and feeds precooled refrigerant into the evaporator through the orifices in the liquid header, with equal distribution through each orifice.

When the refrigerant gas leaving the evaporator becomes cool, the valve automatically reduces the supply of refrigerant to complete the cycle.

Application for patents on this type of low side have been made by General Refrigeration Corp.

Bancredit Plan Lowers Charges On Time Sales

Dealers Are Exempted from Contingent Liability, Get Cash Immediately

NEW YORK CITY—Exemption from contingent liability for the refrigerator dealer and distributor, and reduction of time payment costs to the consumer, have been made possible by a plan for financing refrigerator sales through the First Bancredit Corp., new finance concern, in cooperation with the Federal Housing Administration.

The plan is available to all refrigeration distributors and dealers. At present, the firm is operating out of Philadelphia, Chicago, and New York, but will probably establish branches in other cities soon. It is understood that a group of bankers and financiers from northwestern states have formed a pool to back the plan.

Under this set-up, the finance firm will make all collections and send the full amount of the sale immediately to the dealer. No down payment is required on the sale, and the financing can be extended over 36 months. The new rates established by the concern are said to permit reduction of carrying charges from customary levels—which approximate 16 per cent— to approximately 9½ per cent.

Procedure governing modernization credits under the FHA is as follows:

"Loans to Applicants of Good Credit Standing.—Once an institution is approved for lending, it is at liberty to make loans for the purpose of repair and renovation of real property to any applicant of good credit standing whose stated annual income is five times the amount of the annual repayments required under the loan. Such loans may be repaid over a period of five years.

"Collection of Interest or Fees Limited.—The lending institution may not collect as interest or fee of any kind a total charge in excess of an amount equivalent to $5 discount for each $100 original face amount of one-year instalment note, and the maximum charge permitted on loans of larger amounts extended for longer periods cannot exceed this rate." (The FHA finance charges made through the First Bancredit Corp. are 5 per cent discount per annum.)

" 'Late Charges' Permitted—If the borrower becomes in default, the lending institution may make a 'late charge' not to exceed 5 cents for each $1 for each payment more than 15 days in arrears.

"Borrowers Must Sign Notes.—The borrower is required to sign a note for the principal amount and must arrange for payments on the note by instalments running over a specified period.

"Insured Modernization Loans Limited.—Insured loans for modernization and renovation must not be made for more than $2,000. Note need

(*Concluded on Page 20, Column 1*)

Higher FHA Loan Limit Will Boost Sales of Air Conditioners — Mason

DETROIT—Prediction that the recent raising of the limit of FHA property improvement loans will be the greatest single spur to the development of the air-conditioning industry seen in 1935, was made last week by George W. Mason, president of Kelvinator Corp.

Mr. Mason declared that the extension of government insured loans from $2,000 to $50,000 on property improvement projects opens the way for the financing of air-conditioning installations by thousands of restaurants, hotels, and retail establishments which already have seen in proper air conditioning the ideal method for meeting the demands of modern competition.

Already there have been indications that Kelvinator air-conditioning sales will reflect this liberalization of FHA credit terms, he declared.

"The restaurant owner, theater manager, store proprietor, and owner of other retail establishments all are turning to air conditioning as the newest and most effective method for attracting and keeping customers," Mr. Mason said.

Price Cutting by Dealers Battled by Distributors in Milwaukee

(*Continued from Page 1, Column 2*)

Appliance Association, thinks of the situation may perhaps best be explained by some quotations from a speech he made recently to association members:

"A dealer in our line of business must make each deal profitable—there can be no 'loss leaders'—there can be no sales that will average later. Every dealer must know that he has irreducible items of expense that at a minimum, with average volume of business, is equal to 20 per cent. Most dealers are operating at an overhead nearer 30 per cent.

"It is a simple mathematical calculation to determine how far one can go in meeting a price situation, and unless you are out for revenge, to keep a competitor from making a sale at any price, you know when it is the proper time to say 'no,' and keep' the merchandise on your floor.

"How can this loose, irresponsible, dangerous operator—the cut-price dealer—be improved? I know of no positive cure-all method, because, as a rule, he is the type of operator who prefers to work in the dark, without respect or consideration for his brother dealers.

"Try . . . to bring the offending dealer into the influence of your association . . . and if he is human, he will improve by virtue of contacts established with others who are trying to build soundly. And while perhaps you will not convert him entirely, if you can enlighten him sufficiently that he stiffens up in his trading practice, you will all profit in direct proportion—and the consumer or buyer . . . will be just as well pleased.

"This responsibility does not rest alone with the dealer . . . but is a direct obligation on the part of every distributor and manufacturer.

"It seems entirely unnecessary and cruel that a small handful of dealers . . . can set the pace and establish the ruinous competition that prevails at times in our industry. Something can be done about it . . .

"Let each one of us accept our industry obligation, and attempt individually to enlighten dealers, so that people may buy our appliances at a profit to ourselves and at a cost to them that will insure satisfactory service."

Price has been the central theme of all refrigeration advertising in Milwaukee this spring. Selling the idea of electric refrigeration, rather than price, Mr. Greusel thinks, will be a major step toward making the Milwaukee market refrigeration-minded, instead of price-minded, as it now seems to be.

Right now he's trying to enlist dealer and distributor cooperation in a series of jointly-sponsored advertisements, listing the advantages of electric refrigeration and picturing the various lines available through dealers in Milwaukee—with not a single line about price.

If this campaign goes through, he thinks, it will do a great deal toward putting the refrigeration situation in Milwaukee back on the main track.

Sieg Sells 765 in 5 Months Compared with 601 in '34

One distributor who's been pushing sales for all they're worth this spring is the Sieg Milwaukee Co. (Frigidaire), just starting on its second year in the city under the management of R. B. Reed. Mr. Reed was formerly associated with the Sieg Co. in Davenport, Iowa, and came to Milwaukee as manager when the company opened a branch here.

Sieg's sales, to the end of May, are 25 per cent ahead of last year, 765 units being this year's total against 601 for the same period of 1934.

Mr. Reed isn't crying much over the weather, although he does anticipate a decided upswing when the "force" months do arrive. His company, at the end of May, was 52 per cent along on its quota for the year—and by the end of June he estimates figures will be up around 70 per cent.

The Sieg Co. has 36 dealers, divided half and half between Milwaukee and outside. Close to 75 per cent of sales have been in Milwaukee. Two potentially large outlets, Racine and Kenosha, have been pretty well stopped by labor troubles this spring. But this has been cleared up, and Mr. Reed is looking for a good volume from these and other outstate cities from now on.

Units of 5 and 6 cu. ft., in the Standard, Master, and Super lines, are selling best. Sales to the end of May included 89 Master 5's and 60 Super 6's.

Department stores, in Milwaukee and elsewhere, are doing a good job for Frigidaire—close to 50 per cent of sales have been through those outlets, Mr. Reed said. But the 15 cents a day plan is not particularly successful, despite the fact that, for awhile, it was given considerable promotion.

"Most sales," Mr. Reed said, "are for cash, or for a large down payment and short term payments. The 15-cents-a-day plan never got started here, because Milwaukee people don't believe in buying that way."

Sieg's commercial sales topped $15,000 during the first three months of the year, and are more than 15 per cent ahead of the 1934 figure.

The market for air conditioning, Mr. Reed believes, is potentially good, and there's a real demand for it in Milwaukee. His company is going after all the air-conditioning business it can get. To indicate what his company is doing, he pointed out that of the 317 tons of air-conditioning refrigeration installed in Milwaukee since 1932 by eight companies, Frigidaire has installed 60½ tons.

Recently the Sieg Co. installed a year-'round system in Mader's Restaurant, one of the city's largest eating places, specializing in German food.

This installation will serve as an example of how the Sieg Co. sells air conditioning.

"We won't sell air conditioning under false pretenses," Mr. Reed said. "On most jobs, our bids are high—we make them high purposely.

"When we go out after a job, we sell air conditioning, not price. We explain to the prospect that the cost of a complete system, to handle all temperature variations throughout the year, will be a certain figure. 'But,' we tell the prospect, 'we can put in a system for a lower cost, which will do these things for you . . .' and then we tell him just what the proposed system will do.

"We don't want a buyer to install a system and expect things from it which, obviously, it cannot furnish. We want him to be satisfied with the system, so that, when he wants to build up his system to handle all conditions, he'll come back to us with the job."

The Mader job, for example, requires a 20-ton system for complete conditioning. Sieg's salesmen sold the restaurant owner on putting in a 10-ton system to start with, which would furnish a degree of comfort cooling somewhat below outdoors, though still not all to be desired.

With the increased business the partial system brought him, the proprietor has contracted for the full 20-ton job. The last installation has not been completed as yet. Sieg is hooking up the system in 5-ton units, so that as much or as little of the equipment may be used as is necessary. This makes for economical operation.

The company has installed 19 tons of conditioning equipment this year in the restaurant, three homes, and Coplin's Furriers for fur storage.

Most of Schaefers' 1,417 Sales Outside of City

E. H. Schaefer Corp., General Electric distributor, is finding its best business outside of Milwaukee, President Ed Schaefer says. Close to 75 per cent of the organization's 1,417 sales this year have been outside of the city.

Mr. Schaefer is confident that 1935 is going to be his best year in refrigeration. Figures for the first quarter bear him out—they are $108,000 ahead of the same period last year.

Much of the company's success Mr. Schaefer attributes to the work that his organization is doing with utility companies throughout the state, outside of Milwaukee. One of his field men, E. C. Zabors, has lined up most of the principal utilities in the state—and these, with their aggressive promotional work, are doing a great job of getting G-E's into homes.

Emphasizes Training Course

Mr. Schaefer has put a lot of emphasis on the G-E-LaSalle training course for salesmen, and considers it one of the best possible ways to build up a sound selling organization. At the present time, he said, more interest is being shown in this course than ever before.

The Schaefer organization in Milwaukee sells directly out of the distributor's headquarters. There are no city dealers. There was one, but, Mr. Schaefer explained, "we had to drop him because he insisted on cutting prices and otherwise being a nuisance."

So price-cutting in Milwaukee is no problem for Mr. Schaefer. Out in the state, the utility companies, Mr. Zabors reported, are strict on holding to established retail prices.

Utility Campaign

On May 20, Schaefer's started the "Schaefer Carload Campaign" among companies in the Wisconsin Public Service Corp., which has branches at Green Bay, Manitowoc, Oshkosh, and Marinette. The contest will close Aug. 16. Quota is six carloads of refrigerators, and the winning district manager and salesman, with A. C. Davey, general merchandising manager of the utility, will be taken on a tour of Fort Wayne, Erie, and Cleveland G-E plants.

This contest is proving a big impetus to outstate sales, Mr. Zabor said.

Wisconsin Michigan Power Co., another Schaefer dealer, opened a new showroom at Neenah, Wis., May 1, and is remodeling the sales floor in its Appleton office. Both places will be equipped with a complete General Electric kitchen, and will be air conditioned.

Utilities are good merchandisers, Mr. Zabors says, and he believes that in lining them up, Schaefer has obtained the cream of the dealers in the state. "Utility companies go out and sell," he said. "They don't wait for the public to come in and buy."

Mr. Schaefer has an interesting

(*Continued on Page 3, Column 1*)

Another sale lost

by not **pushing** the convenient way of buying—on the C. I. T. Plan

Dealers may all have a time payment plan, but do all use it effectively? There is a world of difference between the "Terms if Desired" sort of thing, and genuinely featuring and pushing monthly payments from the start.

Many people, eminently worthy of credit, are timid about asking for it. If you want their trade...if you want real volume, act from the outset as if you expected to sell on deferred payments.

In practice it is the quick way to close many sales that might otherwise drag on and be lost.

For an instalment sale is a quick sale when it is financed through C.I.T., which through its Local Office close-by can speedily pass credits and give cash for paper. Moreover its skilled nation-wide organization affords protection in the matter of collections as well as in the handling of credit detail generally.

C. I. T. Plans cover approved types of mechanical refrigerators and water coolers, as well as electric ranges and air-conditioning equipment. Send today for a C. I. T. field man.

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Birmingham – Boise – Boston – Bridgeport – Bronx
Brooklyn – Buffalo – Butte – Camden – Cape Girardeau
Cedar Rapids – Charleston – Charlotte – Chattanooga
Chicago – Cincinnati – Clarksburg – Cleveland
Columbia – Columbus – Cumberland – Dallas – Dayton
Denver – Des Moines – Detroit – El Paso – Erie – Florence
Fort Wayne – Fort Worth – Fresno – Glens Falls
Greensboro – Greenville – Hagerstown – Harrisburg
Hartford – Hempstead – Hickory – Houston
Huntington, W. Va. – Indianapolis – Jacksonville
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Kansas City – Knoxville – Lexington – Lincoln – Little Rock
Los Angeles – Louisville – Manchester – Memphis
Miami – Milwaukee – Minneapolis – Mobile
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REFRIGERATION TUBING ALWAYS HAS A CLEAN BRIGHT SURFACE INSIDE AND OUTSIDE. IT IS ABSOLUTELY DRY AND HAS A UNIFORM SOFT TEMPER. ALL WOLVERINE REFRIGERATION TUBING IS GUARANTEED TO MEET A.S.T.M. SPECIFICATION B-68-33

Immediate delivery from large stock

Write for location of stock nearest you

WOLVERINE TUBE CO.

SEAMLESS COPPER BRASS & ALUMINUM

DETROIT MICHIGAN

Cheese Makers Seen As Big Market for Commercial Units

(*Continued from Page 2, Column 5*)

comment on Milwaukee buying habits.

"People in this town trust one another," he said. "They're apt to call up a salesman and say: 'how much is your 5-ft. refrigerator selling for?' and, when they find out, say: 'send one out.'

"To sell something here, you've got to have the confidence of the customers. If they trust you, your word is good with them, and theirs is good with you.

"We didn't have a single repossession here last year—and we've only had 35 in all the years we've been in business. And most of our sales are for spot cash, or for a large down payment and the balance in two or three months.

"When you make a sale here, you don't have to worry about the money."

Mr. Schaefer is also president of the Milwaukee Electrical League, and under his direction the organization is planning to spend $10,000 this year in a cooperative advertising campaign to educate the public to more extensive and advantageous use of electric current.

Mr. Schaefer is trying to get the Milwaukee utility to change its policy on financing home wiring. He wants the company to rewire a home free of charge for renters, saving the homeowner money, and encouraging more use of electricity. This method, he believes, will more than repay the utility in additional current consumed.

Another thing Mr. Schaefer wants to do is to have the utility sponsor a showroom, to display all manner of electrical devices, and offer free consultation service on home wiring, refrigeration, and allied problems.

While Schaefer's domestic business has been booming, commercial sales haven't been standing still, either. E. V. Oakwood, commercial manager, said sales were 25 per cent ahead of last year, with approximately 60 installations completed. City and state, he said, were running close, with neither having any advantage over the other.

G-E is going out after the high-priced commercial business, too. Most bids, Mr. Oakwood said, are in the $800-$1,000 range. And the company can get this type of business, he believes, because it keeps its commercial sales force low, but insists on top-notch men.

Russ Beer Sales Good

Russ equipment, Mr. Oakwood said, has done much to promote G-E's success in the beer tavern field. Two recent G-E-Russ jobs have gone into Morganroth's and Keene's taverns, in Milwaukee.

Out in the state, the company is concentrating on a comparatively undeveloped field—that of cheese factories.

Recently, Mr. Oakwood said, he installed "conditioned-air" equipment in a dozen cheese factories throughout the state. The coolers have been running large—18x22, 18x20, or 12x16 in most cases.

The value of mechanical refrigeration to cheese makers is that it permits them to hold back a portion of each day's output for ripening in their own storage plants, instead of taking at once to the central storage plant, and accepting the current market price.

Benefit to Cheese Makers

Preserving and ripening the cheese himself, the cheese maker can sell it when his profit will be the largest. But the field here is largely untouched, and most of the product is taken to the central storage plant.

Cheese refrigeration requirements, Mr. Oakwood said, are interesting. Most jobs require temperatures of from 40 to 45°, with 70 to 85 per cent relative humidity.

Another interesting commercial installation was made recently in the Lennon Brothers meat and food market, Oshkosh. Here equipment was installed for a vegetable cooler, a large meat cooler, an 8-ft. delicatessen case, and a 30-ft. top display case.

Mr. Oakwood visualizes the cheese factory market as having great potentialities. In one of the nation's largest dairy centers, he thinks that eventually mechanical refrigeration will replace most, if not all, of the present equipment being used.

Van Antwerpen Says Auto Sales Will Hurt Industry

At the Radio Specialties Co., Leonard distributor, Manager A. Van Antwerpen said his firm's sales were down, compared with last year. This he blamed on adverse weather and the fact that automobile sales are higher this year than in several years past.

High automobile sales are going to mean lower refrigerator sales, he believes. Most people have enough money to by either one, but not both.

What's going to hurt refrigerator sales most, when it's a question of a refrigerator or a new car, is that women prefer refrigerators—but men would rather have a new car. As a result, when the family sits down and discusses prospective purchases, the woman is apt to give in—and the family gets a new car, while the old refrigerator (if there is one) has to do for another year.

Then, too, most distributors were overstocked to start the year—and moving those units before accepting any new stock has been considerable of a problem, Mr. Van Antwerpen said.

Price-cutting? A major problem, he declared.

"There's no controlling 'chiseling' this year—business hasn't been good enough. If there were enough sales to go around, price competition would take care of itself. But so far this year, it's been pretty much a case of every dealer for himself."

Last year, Mr. Van Antwerpen said, there was some attempt to regulate prices, "but department stores, the utility, and one or two of the larger outlets lined up against the rest of us. We found ourselves at loggerheads, and so we didn't get anywhere."

The department stores, utility, and larger outlets wanted a stiffer holding to list prices, with no 10 or 20 per cent reductions for cash, so as to keep up the price level. The smaller outlets asked more flexible trade-in allowances, so as to enable them to get what they considered their share of the business.

This year, Mr. Van Antwerpen said, sales haven't been good enough to even attempt any price regulatory movements.

"Distributors are hungry, and dealers are starving," he declared. "They've been afraid to try anything like stabilizing prices."

Lappin Worried as New Radio Line Is Not Out

Refrigeration business isn't worrying the Lappin Electric Co., Crosley distributor—but radio business is.

Refrigerator sales, reported D. C. Lappin, president, are one-fourth ahead of 1934, and units selling best are in the 4 and 5-cu. ft. sizes.

"But we're worried about the radio line," he said. "We've been promised one for a long time, and our sales are suffering because we're waiting. So far, we haven't even had a notice from the factory as to when distributors will be called in to look at the new models.

"If we get some action soon on the radio line, things will be all right with us this year."

Czech Reports Largest Sales Outstate

Down the street, at Westinghouse Electric Supply Co.'s headquarters, Manager Henry Czech was so busy advising salesmen and answering phone calls that he hardly had time to talk. This is the first year that Westinghouse has had its own distribution outlet in Milwaukee; up to last year, this was handled by Wisconsin Sales & Supply Co.

Sales are holding their own this year, Mr. Czech said, in Milwaukee—but sales outside the metropolitan district are much more encouraging than they are in the city itself.

Better weather in the rest of the state, Mr. Czech believes, is largely responsible for the pickup in sales there.

"This is the first warm day we've had," he said, as he jerked off his coat and swung around to answer the telephone. "I was beginning to believe we were never going to have any warmer weather here."

Best sellers are 4 and 5-cu. ft. units in Milwaukee, and 5 and 6-cu. ft. units outstate. "And we've got to make our sales in the next couple of months," he said, "or people who haven't bought by that time will put it off until next year."

June 14 Biggest Day in Maurer-Greusel Career

When you've just finished the biggest day in your history, naturally you're feeling tip-top. That's the way things were at Maurer-Greusel Co., Grunow distributor.

President H. V. Maurer was loth to give definite figures, but admitted that shipments were far in excess of last year—and that a little more warm weather would put sales over in a big way.

Maurer-Greusel is a comparatively new company, having been in business about two years. Stressing the Carrene theme, a larger advertising budget has produced very satisfactory sales results, Mr. Maurer said.

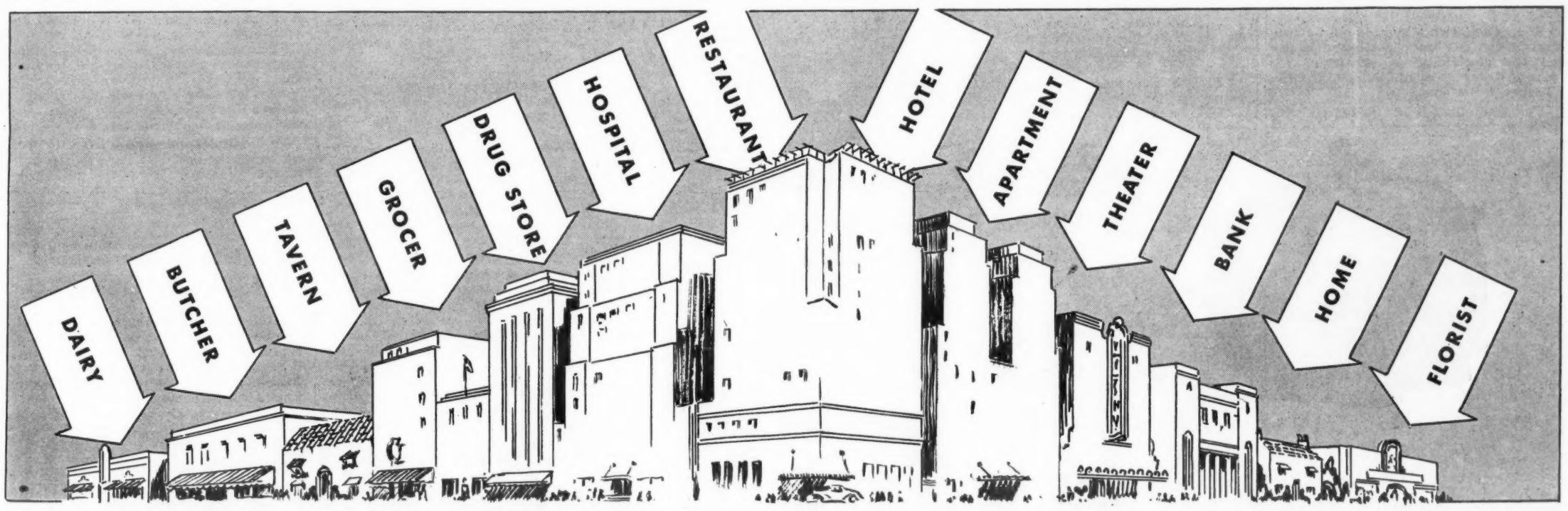
Grunow isn't in commercial, but Mr. Maurer is looking ahead to the time when it will be. Realizing the potentialities of the dairy market, he has devised a milk cooler, using a standard Grunow condensing unit, which he says will be inexpensive, safe, and practical for dairy farm use.

He has submitted the outline of his plan to General Household Utilities Co. for consideration, and is waiting for the opinion of Grunow executives on the idea.

Taylor Electric Sales Show Improvement

"Norging Ahead Together" has been a big help in boosting sales of Taylor Electric Co., Norge distributor, the manager of city sales reported. The organization's 20 sales outlets in Milwaukee are selling 25 per cent more Norges than at this time last

(*Concluded on Page 4, Column 1*)



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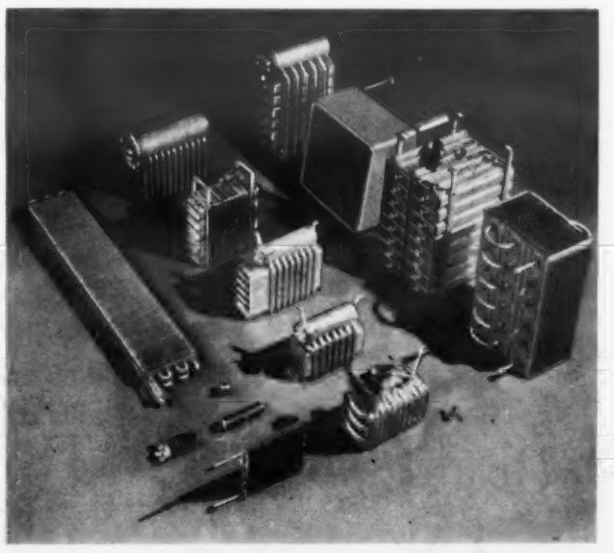

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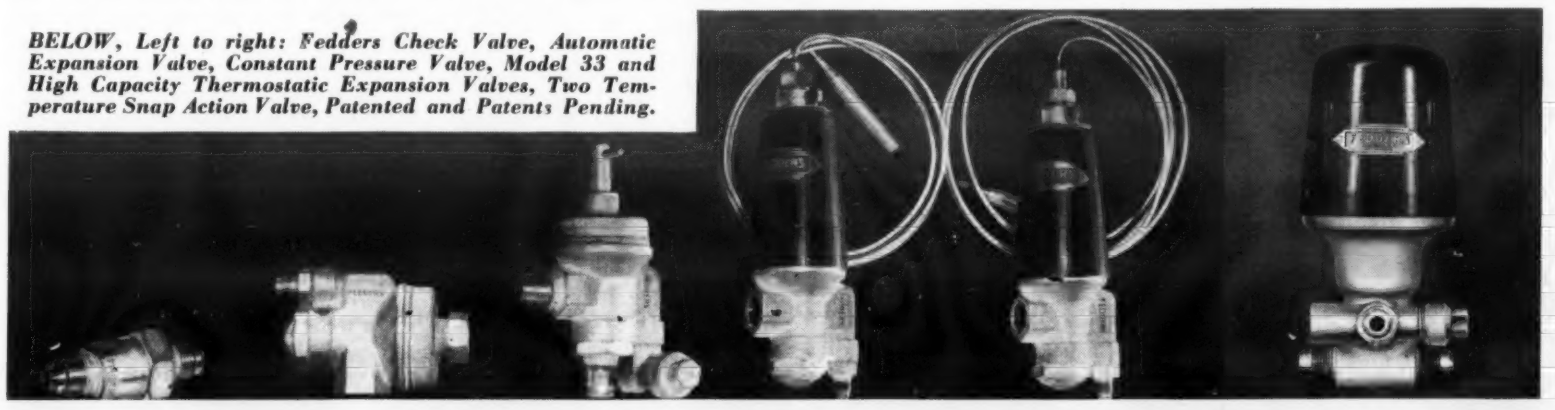

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ARE YOU GETTING YOUR COPY OF THE FEDDERS NEWS?

Manufacturers Are Blamed by Barbour For Price Situation

(*Concluded from Page 3, Column 5*)

year—and business outside of Milwaukee is even better than that.

Warm weather in those parts was considered largely responsible for increased outstate sales. The Norge dealer in Marinette, it was said, had quadrupled his 1934 sales, to the middle of June.

Commercial business is good—but Norge hasn't been in commercial long, so there were no comparative figures to be had on operations this year and last. Taylor Electric hasn't been distributing Norge long, either—the original distributor went out of business, and Taylor's, which had been RCA radio and tube distributor, had taken on the line.

Taylor isn't bidding in on the bigger jobs, because Norge isn't making the equipment to handle the larger installations. But sales on smaller jobs, it was reported, were promising.

Milwaukee Utility Ends 'Free Current' Campaign

At the Electric Co., offices of Milwaukee Electric Railway & Light Co., they were just finishing up the second year with a "free electricity" campaign, designed not so much to sell appliances merchandised by the utility as to build power lines in any manner possible.

The utility in Milwaukee isn't competing strenuously with the dealers in the battle for refrigerator sales. The organization handles one line, Kelvinator, and results of its promotion on refrigerator business can be gathered from the reply one salesman made to a query as to sales this year: "They're lousy!"

Sales may not be spectacular—but the utility has the friendship of all distributors in the city, and a good majority of the dealers.

The "free electricity" campaign offers two months electricity free to customers who wish to take advantage of it. Its term are:

For the two months following March, the customer is allowed to use all the electricity *in excess of his March total* free of charge, in any manner he wishes.

For example, if a customer uses 15 kwh. during March, 45 kwh. during April, and 50 kwh. during May, he still pays only for 15 kwh. during the two months—the additional electric current is free. This agreement holds, regardless of how much current the customer consumes during that period.

The utility, in promoting the campaign, urges its patrons to use more lights, or to buy an electric range or a refrigerator during the "free period, and get two months use of the appliance without additional cost.

F. A. Coffin, sales manager of the utility's store, said the first year's results were good, from the standpoint of additional current consumed, and that it boosted current use all during the year—although not as much as during the "free" period.

This year's campaign, he said, was even better than last year's. Bills don't run out until about the middle of June, Mr. Coffin said, and tabulations are not made until after that—so just how much better this year was than last hasn't as yet been determined.

Buying Pool of Dealers Suggested by Barbour

Reputable dealers, as mentioned above, are up in arms over the price-cutting situation, but none of them more so than Raleigh W. Barbour, president of the Wisconsin Sales & Supply Co.

Mr. Barbour's firm operates three retail stores in Milwaukee, handling Westinghouse and Grunow. His sales manager, Anton Bezucha, is a member of Westinghouse's Quota Busters Club.

Up to a year ago, Wisconsin Sales & Supply acted as Westinghouse distributor in the metropolitan Milwaukee area. So Mr. Barbour should know the situation from inside as well as out.

There's no mistaking what he thinks of the current condition of the Milwaukee market—and he lays a certain share of the blame right where he thinks it belongs—at the door of the manufacturer.

He says:

"The electric refrigerator sales situation in Milwaukee during the last year has been desperate for three reasons:

"1. The lack of understanding on the part of the manufacturer.

"2. The weather, about which even the manufacturer can do nothing.

"3. The unprecedented competition from the ice companies.

"We, as dealers, touch our hat to the other dealers in Milwaukee, and believe they are the finest bunch of she-wolf salesmen, backed up against the wall, that exist. In fact, they are too shrewd for their own welfare."

Mr. Barbour submitted three advertisements from Milwaukee newspapers, to show how much price talk prevails.

Advertise $47 Refrigerator

The first of these announced a sale of demonstrator refrigerators starting as low as $47; the second, a clearance sale, with prices beginning at $49.50; and the third a two-day sale of Crosley refrigerators, with $69.50 as the bottom price.

"These dealers are creating sales for nothing but $47 electric refrigerators," Mr. Barbour charged. "The emphasis is entirely on price. A person who pays more than $47 feels that he's been 'gypped,' or has been played for a sucker.

"The public has become price-conscious. The average prospect is entirely lacking in the knowledge of what is a good refrigerator. He is not aware of the important factors of good refrigeration—quietness, trouble-free service, convenience, economy, etc.

"He is made to think in terms of price—in spite of the fact that true selling is based entirely on the advantages that the customer will enjoy when the appliance is installed in his home.

Price Determining Factor

"Price becomes the determining factor, in spite of the manufacturer's advertising and publicity."

He pointed out that all of the refrigerators mentioned above are normally in the $150 to $200 price class—while the prices quoted on them are much lower.

"The theory behind these newspaper ads," Mr. Barbour alleges, "is to get a customer into the store and then build him up to a nationally advertised box at a higher price. I believe that the value of expensive national advertising is lost, and that an entirely false idea is being given as to values by such kind of advertising.

"As to selling, the situation has reached a point where if you don't close the sale with the prospect on the floor in the first interview, you might just as well kiss the prospect goodbye. A 'chiseler' will take the business away from you even if it nets him only $5 profit or less. As a result, this is what is happening:

"Mrs. Smith walks into the store and states that she is interested in a Blank refrigerator. She says that she dropped into a store up the street and they said the price for that make was $195. The dealer, knowing the store up the street, says immediately that the dealer has quoted the wrong price—that the box never sold for $195, but that it originally sold for $174. He adds, 'However, if you will take it now, Madam, I will let you have it for $169, because I have a quota to make by the 15th of the month.' Or he gives some other equally silly excuse for cutting the price.

Not True in Dept. Stores

"This situation does not hold true of department stores and utilities. It is true only of that class of dealers that manufacturers, in their insatiable greed for volume and profits, have admitted into this field. Department stores have too much at stake to engage in this kind of selling. They are placed in the same unfortunate position as other reputable dealers.

"Is there any reason why all dealers should not engage in fair competition? Utilities and department stores set a standard for honest, truthful, constructive advertising. Is there any reason why all dealers should not adhere to the high standards set by these reliable, well-established merchandisers?

Do Manufacturers Know About It?

"Can we believe that manufacturers are not aware of this situation? Can we believe that they do not want to uphold their prices? Can it be that they, or their own district men, do not read the newspapers? Must we believe that they do not read the advertisements of their competitors?

"In other words, are the manufacturers so dumb that they do not know what it is all about?

"The manufacturer sells his boxes at a certain price, this price of course to yield his predetermined profit. Apparently he is satisfied to get this price, regardless of who pays it, the dealer or the customer.

"I sat in the office of one of the high lords of the business, and watched him compare the year's quota of some city that is strike-ridden, like Racine, with some other city like Timbuctu.

"The corner druggist in Timbuctu sold 150 boxes, while the dealer in Racine sold only 75. 'Cancel him out,' says the hard-boiled district manager. 'He's no good.'

Manufacturers Responsible

"The dealer has invested his capital and his life work in the appliance business, and is perhaps being pressed by the bank and the finance company, to say nothing of his wife. The district man is not to blame however—someone at the plant had said: 'Boys, we are going to manufacture 250,000 refrigerators this year—and you are going to sell them.'

"Pressing—pressing to what? The situation in Milwaukee is pressing—the result of your pressing, Mr. manufacturer!" Mr. Barbour charged. "And I firmly believe that the ice companies are going to come out on top. If the manufacturer were to study the situation of the people on relief, of whom we have 100,000, perhaps his ideas would change on production and distribution.

"Perhaps the manufacturer's idea is the result of playing 'the law of averages.' 'If we can't get business in Milwaukee, we'll get it in Timbuctu. If we got a bum dealer or distributor we'll put the steam on him, and let our sales force find another one.' This is usually done without careful investigation.

"I recently opened a downtown store where thousands of people pass every day. The distributors were glad to furnish the advertising, because they couldn't resist it.

"The distributors, not the factory, paid for it, because the factory believes that $25,000 in the *Saturday Evening Post* is worth more than dealer window displays, which cost about 60 cents per dealer. I have known manufacturers to pay a $25 weekly rental for drug store window displays."

Suggests Buying Pool

The remedy for this situation, Mr. Barbour believes, is perhaps a buying pool of dealers. This would include all reputable appliance dealers, department stores, and utilities. This organization would be limited to bona-fide dealers (it should not include distributors who already have their own organization with entirely different problems than the dealer)—piano stores, automobile dealers, and corner drug stores would be eliminated. The organization would be led by utilities and department stores.

"This buying pool would control discounts to reputable appliance dealers, and would control advertising with the idea of eliminating malicious advertising, and vicious sales practices," Mr. Barbour said. "It should be in a position to be consulted before any dealers are established by any manufacturer.

Recognize Dealers Only

The members of this pool, properly supported by reputable manufacturers, would refuse to handle, or permit any one else to handle, any disreputable box, marketed solely for the purpose of making a profit for some fly-by-night manufacturer. The distributor would not be allowed to sell to any but recognized electric appliance dealers, who are making their living from this field.

"We lost two jobs the other day to a feed and flour store! One of our biggest competitors is an automobile dealer! We know that we cannot buy an automobile to put on our show floor. We are supposed to be specialists in our business. Are we supposed to be merchandisers?

"Some independent distributors are trying their best, but are subject to severe pressure from the factories which prevents their accomplishing the desired end—clean merchandising."

Boutells in Minneapolis To Handle Crosleys

MINNEAPOLIS—Boutells, here will handle Crosley electric refrigerators, reports E. C. Madson of Lew Bonn Co., Crosley distributor in this city. Mr. Franklyn is manager of the refrigeration division of the store.

Century MOTORS

SINGLE PHASE—POLYPHASE
DIRECT CURRENT—CAPACITOR

READY *Long Before* AIR CONDITIONING Became an Industry

The commanding position of Century Motors in the field of Air Conditioning is the result:

—of more than 31 years' successful preparation and continuous progress

—of being ready, *in advance*, with every type and size of motor necessary in developing and perfecting

Refrigerating Machines...Blowers...Fans...Pumps Stokers...Oil Burners...and Similar Equipment

—of the experienced ability to meet and often anticipate all the exacting requirements of this industry.

Regardless of your requirements, Century Motors give you definite assurance of reliable, continuous performance.

Single Phase, Polyphase, Multispeed, Capacitor and Direct Current Motors.

Sizes, 1/250 to 600 Horse Power. Consult Century Engineers.

Century MOTORS 1/250 TO 600 HORSE POWER

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Mo.
Offices and Stock Points in Principal Cities

When You Sell COPELAND ...You Sell LONG-TIME Performance

WHY make a lot of money on so-called big profits—and lose it all on endless service calls? Copeland dealers don't. When you sell a Copeland, you can deliver the job and forget it, because Copeland engineering and design assures long time performance. You can confidently build for the future with Copeland because when you sell a Copeland, it stays sold! Only four Copeland models—all fast movers! A small, compact line that you can turnover fast, and sell with full confidence that every sale makes a new business booster.

COPELAND REFRIGERATION CORPORATION
Manufacturers of a Complete line of Household and Commercial Refrigeration
Holden Ave. at Lincoln . . . DETROIT, MICH.

Copeland
DEPENDABLE Electric REFRIGERATION

AIR CONDITIONING

Chicago Standards for 'Certified' Air Conditioning Designed To 'Protect' Prospects

(*Continued from Page 1, Column 4*)

Western Society of Engineers, the Chicago Master Steam Fitters Association, and the Chicago Ventilating and Air Conditioning Contractors Association.

These standards have been adopted by the two contractors' organizations and have been endorsed in principle by the Illinois Chapter of the American Society of Heating and Ventilating Engineers.

"There is no compulsion on anycne to follow these standards unless he wishes to make an installation which can be certified just as heating installations are certified by the Chicago Master Steam Fitters Association," Mr. Lewis explained.

"Brief experience has demonstrated that many owners refuse to accept plants which cannot be certified as complying with these standards and it is believed that their use will be effective in improving the general quality of the work done without increasing the cost of quality results.

"In many cases mistakes in computation will be discovered and corrected before it is too late, as a result of expert checking of data by an independent qualified engineer, just as countless corrections in boiler and radiator and piping selection have been discovered and corrected under Certified Heating practice.

"Anyone may have his plans and specifications certified for a small fee and the work is done by a regular salaried employee of the two contracting organizations.

"In case corrections are required no information is disclosed except to the person or firm by whom the project is submitted. The central examining staff will gladly explain the standards, but cannot design apparatus, recommend any specific design or system nor suggest any particular manufacturer.

"If a design is certified, the combined resources of the two contracting organizations assure proper installation and operation of the plant because through their influence with the contractor supplemented by the experience and ability of the governing committees, bad workmanship will be corrected or even apparatus of manifestly improper size will be replaced.

"The common experience of Chicago building owners, who heed the request of manufacturers' representatives for permission to bid on proposed air-conditioning projects, has been that the proposals varied to such an extent that no confidence could be placed in the bids.

"Several very interesting projects for which funds were available, were abandoned, because the owner said, 'If air conditioning is as crazy as these proposals indicate with as much as 100 per cent difference on tonnage for the same job and if all bidders are anxious to sell me cast-iron, copper-plated guarantees, I'll just wait until I become convinced that the bugs have been driven out and you fellows learn what you are about.'"

Information for Checking

The Chicago standards require that if an installation of Certified Air Conditioning is to be made the plans and specifications must show how the load demand was developed. Here is the clause which covers this point:

2. INFORMATION FOR CHECKING. The plan and/or specifications of all air-conditioning installations submitted under this standard shall set forth the heat transmission factors for barriers and the amounts and sources of heat loss and gain. The design temperatures and relative humidity shall be recorded for air outside and inside, also for condensing air or water, and for the heat transferring medium.

These governing design factors and temperatures shall be such as to produce an effective result at least equal to those set forth in these standards.

The clause about guarantees is as follows:

Guarantees

3. GUARANTEES. Guarantees of performance in specifications on which competitive bids are taken where definite minimum sizes of apparatus are specified, shall be limited to the requirement that each piece of apparatus shall deliver the rated output stipulated by its manufacturer, and that the contractor's performance guarantee shall include only the adjustment and coordination of these various capacities.

"This item is an ancient bone of contention," declared Mr. Lewis. "No self-respecting consulting engineer will include in his specifications the all-embracing guarantee that the contractor must furnish everything that is omitted from the specifications which the engineer or owner might think should be furnished in order to make a complete and perfect job.

"An engineer is reluctant to require that the contractor, competing in price with others who perhaps are not competent or honest, shall guarantee that the sizes of apparatus which the contractor didn't select shall be big enough to do everything that everyone thinks ought to be done.

"The committee may modify this clause to the extent that if the owner wishes to receive from the contractor a guarantee of sufficiency and of operating performance the contractor shall be required to check the capacities of equipment and may increase such capacities at his own option, stating the difference in price if any, without prejudice or sacrifice of good will, so that all may enter into a guarantee of performance with their eyes open.

"It is realized that an owner may fairly require the added insurance of a bonded contractor and may require that large sums of money shall be withheld pending fulfillment of a guarantee, provided that all concerned understand the situation."

Design temperatures and relative humidities are specified in Items 5, 6, 7, and 8:

Outside in winter, —10° F.

Inside in winter, 70° F. and capable of producing 30 per cent relative humidity when the outside condition is 30° F. and 40 per cent relative humidity, with explanations about danger of frosting.

Outside in summer, 95° F. and 40 per cent relative humidity.

Inside in summer, 80° F. and 55 per cent relative humidity.

It is probable that a clause will be added to make clear the reasonable understanding that any Effective Temperature equivalent to 80° F. and 55 per cent would be acceptable, Mr. Lewis stated.

In Item 9 a small allowance for infiltration is provided for summer even though some people argue that infiltration in summer is ordinarily negligible. The allowance is stipulated because of the belief that when room-located unit recirculating cooling machines are used there must be local provision for condensing the moisture of inleaking air.

The stipulated allowances for infiltration are 60 cu. ft. per hour per square foot of all the area of windows and doors in outside barriers in winter.

"This is a simple approximation and does not in any way prevent the designer from computing crack width and wind velocity nor militate against his prayer that the crack will not increase or decrease nor that the wind will not blow more belligerently than at the usual 15 mile per hour rate," said the Chicago consultant.

The infiltration allowance when cooling is suggested as a minimum of 15 cu. ft. of air per hour per square foot for all of the area of these same openings and explanation is made that the sensible and latent heat for this air must be figured out and added into the load.

Solar Heat Allowances

Minimum solar heat allowances are set forth in a very simple table as follows:

10. DESIGN ALLOWANCES FOR HEAT GAIN DUE TO SUNLIGHT. Shall not be less for each exposure than those shown by the accompanying table:

	N	NE 7 AM	E 8 AM	SE 9 AM	S 12:00	SW 3 PM	W 4 PM	NW 5 PM
Window	0	100	130	110	70	110	130	100
Skylight	0	60	100	135	180	135	100	60
Wall	0	0	2	2	2	3	3	3
Roof	0	0	0	2	4	5	5	4

The above allowances per square foot of sun-exposed area for walls and roofs are on a basic heat-transfer resistance of *U*-0.3 and a gray surface color. Variations in the value of *U* and in the color coefficient ordinarily affect the result to a negligible extent.

(a) For restaurants and similar rooms in which the heat gain, due to occupancy and due to process work, is an important factor, the total heat including sunlight heat should be computed as of the hour when all other than sunshine is at the minimum.

The total heat including sunlight heat and the heat other than that from sunshine should be computed also at the hour when sunshine is at the maximum. Whichever of these two heat inputs is greater should be used.

This explanation is made to avoid possible misinterpretation and the provision of unnecessary capacity such as might be called for if the maximum heat during the 12:00 noon hour of a restaurant having a large west sunshine exposure were added to the 3 p. m. sunlight heat.

(b) When computing the refrigerating capacity for any building having many rooms and several different sunshine exposures, it will be necessary to re-compute the sunshine heat effect for the building as a whole and to use only the greatest time-direction factor for the building as a whole, in determining the tonnage. Otherwise, for instance, the total east sunshine heat for many rooms might be added to the total west sunshine effect for many rooms, whereas only the greater of these two sums need be provided.

(c) When computing the sunshine heat effect for any room which has more than one wall exposed to direct sunlight at any given time, only the heat input for the side having the greatest value is to be considered.

Allowances for Shade

The standards have the following to say about allowance for shade from trees, buildings, and the like:

11. DESIGN ALLOWANCE FOR SHADING FROM SUNSHINE shall be made only when the plans and specifications specifically show such allowance, and give assurance that the owner is cognizant of the reduction in capacity on this account. A design reduction on account of shading, which may be temporary if the shading structure should be removed, or which depends upon human operation, is of questionable wisdom. If the shading is present, of course, the operating expense will be reduced.

Item 12 covers design air quantity. The present requirements of the ventilation code of the city of Chicago for school rooms and auditoriums, factories, and similar occupied space having fixed seats, is a minimum of 1,500 cfh. taken from outside for each sitting. If 12 sq. ft. of floor is allowed per person this means approximately, 2 cu. ft. of air per square feet of floor per minute.

For stores this quantity is reduced to 1.8 c.f.m. per square foot of floor for basements and to 1.5 c.f.m. per square foot of floor for first stories.

For restaurants 1.65 c.f.m. per square foot of floor holds, except that in kitchens, where double this amount, 3.33 c.f.m. per square foot of floor is required or a change every 3 minutes must be provided on the basis of a 10 ft. ceiling.

There is some tendency toward unofficial leniency for plants which are capable of handling code requirements when heating or when cooling without refrigeration, if during the use of refrigeration they do not recirculate more than 66⅔ of the air. This is a reasonable attitude and is said to be in effect pending adoption of the new Chicago Building Code which probably will legalize two-thirds recirculation, Mr. Lewis explained.

Design Air Quantity

This is in explanation of Items 12 and 13 of the Standards, which read as follows:

12. DESIGN AIR QUANTITY. (a) For winter air conditioning the design air quantity shall be not less than the requirements of the City of Chicago for ventilated rooms.

In rooms which do not come under the Code as of February, 1935, such as residences, a minimum air circulation of four changes per hour shall be provided. In such rooms where the occupancy by people is the governing factor, an air circulation of not less than 25 cu. ft. per minute per person shall be provided.

(b) For summer air conditioning the design air quantity shall be sufficient to extract the surplus heat at the air inlet and outlet temperatures specified, and in addition shall be not less than the requirements of the City of Chicago, for ventilated rooms.

In rooms which do not come under the Code as of February 1935, such as residences, a minimum air circulation of four changes per hour shall be provided. In such rooms where the occupancy by people is the governing factor an air circulation of not less than 25 cu. ft. per minute per person shall be provided.

Recirculation & Fresh Air

13. RECIRCULATION AND AIR FROM OUTSIDE. Provision may be made in the duct design for recirculation of not more than 66⅔ per cent of the circulated air, with 33⅓ per cent air from outside, which always shall be provided to dilute odors during occupancy. The inlet and ducts shall have sufficient capacity to permit the introduction of 100 per cent of air from outside for operation during the periods of intermediate outside temperature.

"There is no particular authority for the 5° temperature difference suggested in sub head (a) of Item 14, except that it appeared wise to state some value," said Mr. Lewis.

"The 5° is a matter of judgment. In sub head (b) the rule of 2° per foot in height above the floor is based on the experience of the group and would allow a 20° temperature spread

(*Continued on Page 6, Column 1*)

PERFORMANCE

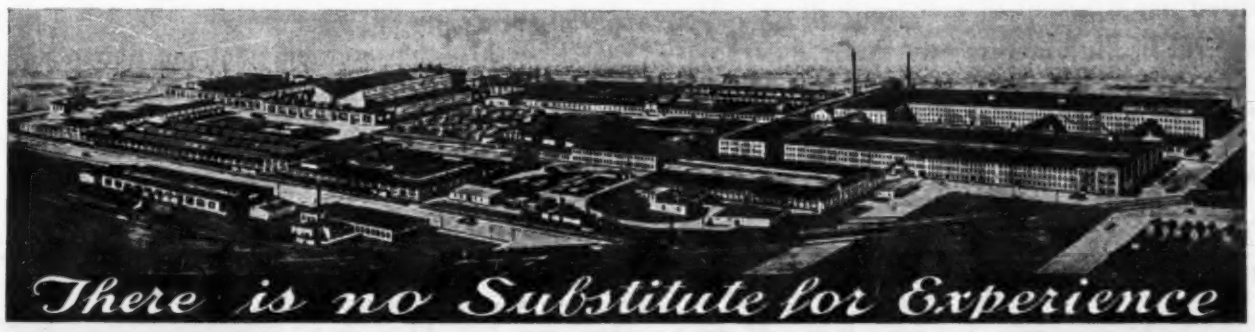
Year in and year out, Winter and Summer, Servel products are noted for their consistent performance. They are remarkably free from the petty ailments that annoy the user and steal profits from the dealer. This superiority has not been achieved in a day, but rather is the result of selective evolution over a long period of time. The hundreds of intricate details that account for Servel's popularity today have been thoroughly tested, in laboratory and field, for so long a time that consistent performance is a foregone conclusion.

SERVEL

COMMERCIAL REFRIGERATION

SERVEL, INC. *Commercial Refrigeration Division* EVANSVILLE, IND.

This modern 30-acre plant is the home of Servel Commercial Refrigeration and the world-famous Electrolux, the Servel Gas Refrigerator



AIR CONDITIONING

Lewis Tells ASHVE Of Chicago Standard For Air Conditioning

(*Continued from Page 5, Column 5*)

in an 11 ft. ceiling provided that the inlet grille is not more than 12 inches high. Surely this seems a liberal allowance.

"The minimum of 100 linear feet per minute air velocity for horizontally discharging openings probably is far too low. In the judgment of some a minimum of 300 linear feet per minute would be more nearly correct."

Diffusion of Entering Air

14. DIFFUSION OF ENTERING AIR. The location, shape, physical characteristics of, and air velocities and temperatures through the inlets and outlets for conditioned air to the rooms shall be such as will promote distribution of the circulation throughout all occupied portions without causing discomfort.

(a) Downward discharging air inlets in rooms shall be provided with safeguards to prevent drafts at the occupied zone. These safeguards shall include plaques, injector type grilles, or other devices which shall discharge the air at an angle to the vertical and which will prevent air colder than the room air from falling vertically downward at speeds capable of causing discomfort. Unless such safeguards shall be provided, the design entering air temperature from inlets discharging vertically downward shall be not more than 5 degrees colder than the room air at the approximate level of the inlet.

(b) The difference in temperature between the entering air and the room air for horizontally discharging supply openings in side walls with conventional registers when cooling shall never exceed 2 degrees per foot in height from the floor to the bottom of the opening.

Horizontally discharging air inlets in rooms when placed higher than head level shall be designed for sufficient velocity of discharge to bring about diffusion without drafts, especially when the entering air is cooler than the room air. The minimum design air inlet velocity shall be 100 linear feet per minute. The entering air velocity may be rapid for such openings, provided that high speed jets of air do not rebound from columns, walls, etc., so as to create discomfort to people.

(c) Upward discharging air inlets in rooms shall be designed with arrangements, especially when delivering air cooler than the air in the room, so that a velocity of at least 300 linear feet per minute may be obtained so as to promote diffusion.

In Item 15 a stipulation is made that the refrigerant and the refrigerating apparatus shall comply with the rules of the Board of Health and of the Chicago Master Steam Fitters.

"These rules in a general way are no more severe than the A.S.A. Safety Code covering the installation of refrigerating apparatus sponsored by American Society of Refrigerating Engineers," Mr. Lewis declared.

"There are rather drastic speed limitations given for reciprocating compressors, based on the experience of the contractors organization but checked with several prominent manufacturers. The speed limits were made rather low because under such circumstances the machines assuredly should have a long life and will have a desirable surplus capacity as a reserve against mistakes in estimating the demand or against possible future increases in load.

"The condenser areas specified are also liberal, to provide against scale and dirt and to give a reasonable reserve capacity. The condensing water temperatures are standards and their inclusion gives a basis for reference and safeguards fair competition.

"It should be explained that the specific limitations of Item 15 will be administered liberally, and that if any manufacturer should evolve some especially efficient process or device which contravenes them the committee which is continuing will consider proper revisions."

Refrigerating Apparatus And Refrigerants

15. REFRIGERATING APPARATUS AND REFRIGERANTS. All refrigerating and cooling equipment, piping and specialties used in connection with air conditioning shall be designed and installed in accordance with the requirements of the Chicago City Department of Boiler Inspection and Cooling Plants, the rules of the Chicago Board of Health, and the standards of the Chicago Master Steam Fitters' Association.

The following minimum acceptable capacities for the various parts of the refrigerating apparatus to be used in comfort cooling:

(a) Evaporator; pressure difference between inlet and outlet not to exceed one pound per sq. in.

(b) Compressor; the load permitted on reciprocating refrigerating compressors under these standards shall not exceed the output delivered at the speeds set forth below; and the maximum operating speed shall be limited accordingly.

For Multicylinder machines delivering not to exceed 25,000 B.t.u.h. per cylinder, 400 r.p.m.

For similar machines delivering more than 25,000 and less than 50,000 B.t.u.h. per cylinder, 360 r.p.m.

For similar machines delivering 50,000 and less than 100,000 B.t.u.h. per cylinder, 290 r.p.m.

For similar machines delivering 100,000 and less than 200,000 B.t.u.h. per cylinder, 220 r.p.m.

For similar machines delivering 200,000 and less than 300,000 B.t.u.h. per cylinder, 175 r.p.m.

For similar machines delivering more than 300,000 B.t.u.h. per cylinder, 150 r.p.m.

It is understood that reasonable variations may be interpolated between these limiting relations as they have been taken from a plotted curve.

(c) Condenser, normal condensing pressure shall correspond to 86° F. for the refrigerant used. For each 12,000 B.t.u.h. heat transfer, the effective water cooling surface shall be not less than the following:

Double pipe type, made of copper, 6 sq. ft.

Shell and coil type with copper coil, 8 sq. ft.

Shell and tube type with steel tubes and equipped with swirling devices, 8 sq. ft.

If other material other than copper is employed correction shall be made for any difference in conductivity.

(d) Condensing water; not cooler for Chicago city water than 76° F. Not cooler for cooling tower than 80° F.

(e) Power required from the driver in no case shall exceed the manufacturer's normal rating.

(f) The receiver shall be of sufficient capacity to permit pumping out the evaporator and the liquid lines without increasing the condensing pressure more than 50 per cent above the normal pressure (corresponding to 86° F.) for the kind of refrigerant used. The refrigerant should be pumped out of the evaporators and stored in the receiver during the period when the apparatus functions for heating or is exposed to room temperature of 70 or 80° F.

(g) Apparatus such as evaporators, condensing units, expansion valves, etc., shall be installed with sufficient line valves and proper fittings, to permit efficient servicing, or quick replacement of parts without exposing the interior of the refrigerant-containing parts of the system to air and moisture. Refrigerant lines shall be of proper size to prevent any appreciable pressure difference between the evaporators and the compressor.

(h) Accessibility for servicing and repair of all parts of air-conditioning systems must be provided.

Metal Used for Housing, Tanks & Ducts

"Item 16 deals with gauges and weights and bracing of ducts and housings and reflects the experience of sheet metal contractors especially as to the calls which they have had for repairs and maintenance," the engineers were told.

"Too many existing duct systems have their bottoms bulging down and leaking due not only to the periodical entry by men for cleaning purposes but also due to workmen entering during the process of erection. Some standard of this kind has been needed for a long time, though approximately the same data have been available."

16. METALS USED FOR HOUSING, TANKS, DUCTS, ETC., in air conditioning installations shall be of moisture resisting character and of such weight and with such bracing as will prevent vibration. The ducts shall be substantially air tight.

Each branch of a supply duct system shall have facilities for adjusting the air volume delivered. Preferably these dampers shall be at junction points and alternatively they may be at the registers.

If galvanized steel sheets are used they shall not be lighter than the U. S. gauges listed below with structural steel exterior bracing as shown.

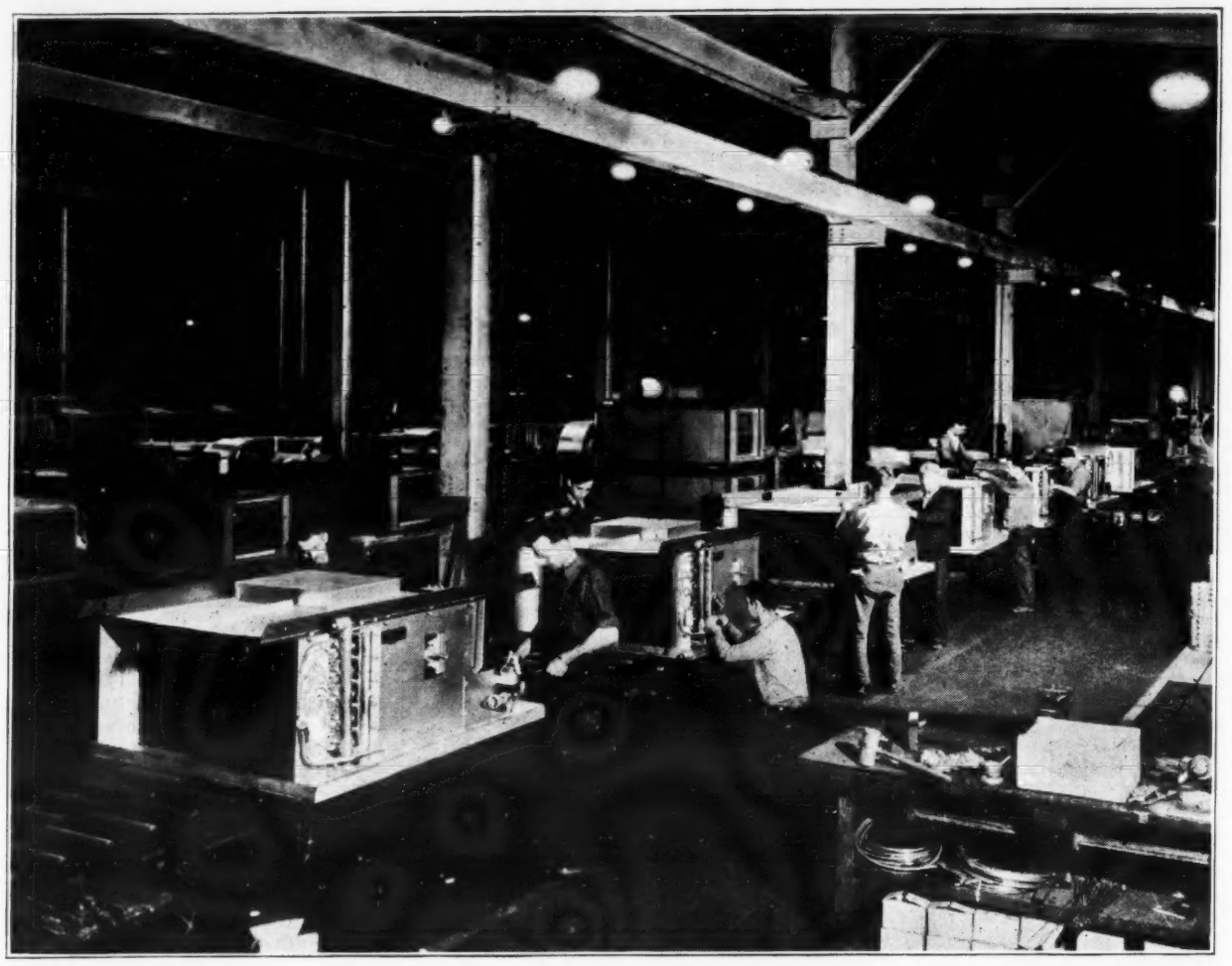
Service	Gauge of Metal
Intakes	20
Heater casings	16
Filter, heater, and other chambers	20
Rectangular Ducts:	
Less than 18 in. wide or high	26
18 in. to 29 in. wide or high	24
30 in. to 47 in. wide or high	22
48 in. to 60 in. wide or high	20
Over 60 in.	18

Size of Bracing
1¼ in. x 1¼ in. x ⅛ in. minimum
1 in. x 1 in. x ⅛ in.
1¼ in. x 1¼ in. x ⅛ in.
1½ in. x 1½ in. x 3/16 in.

If the duct has width or height of more than 24 in., there shall be transverse exterior braces for such surfaces not more than 48 in. on centers. Where "S" cleats and drive cleats are used to connect ducts, formed angle

(*Concluded on Page 7, Column 1*)

Production of Air Conditioners Speeded Up

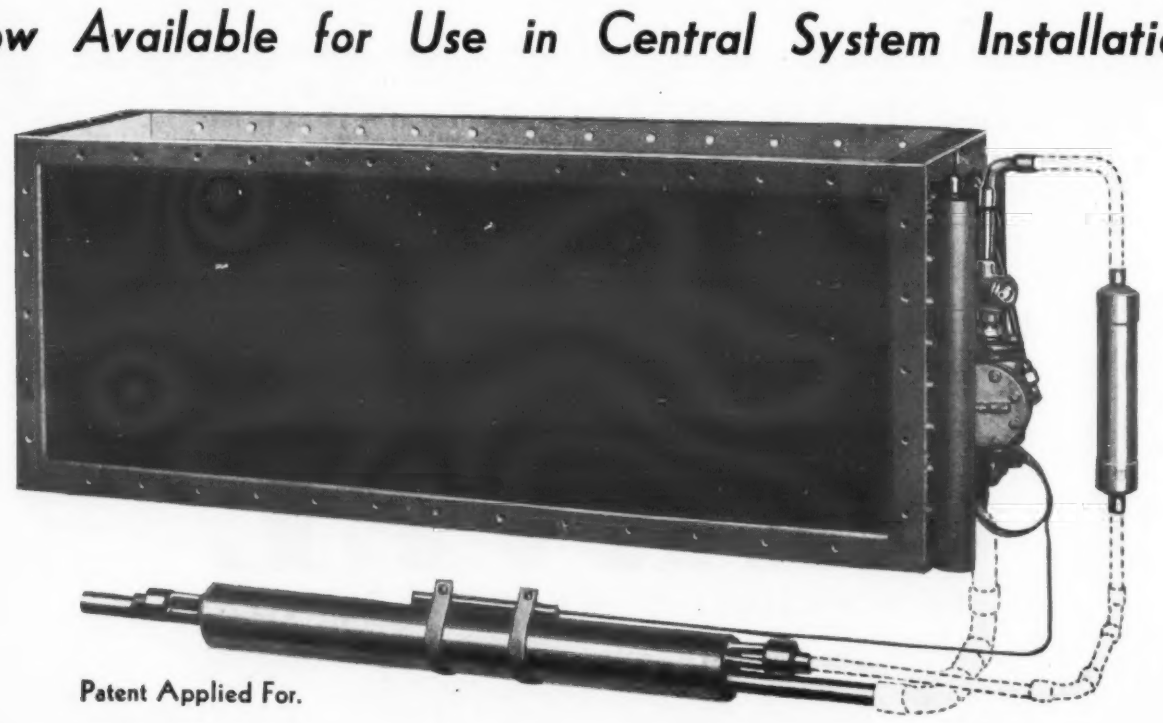


Air-conditioning production lines are working at peak capacity these days to meet heavy demands for comfort cooling equipment. This picture shows an assembly line on York horizontal-type air conditioners, photographed during one of the night shifts at the York plant.

Lipman AIR CONDITIONING

LOW-SIDE EQUIPMENT

Now Available for Use in Central System Installations



Patent Applied For.

LIPMAN Air Conditioning Low-sides offer a decided improvement in evaporator design. The refrigerant is distributed evenly into the evaporator through a liquid line header which is kept full of liquid refrigerant at all times. A single expansion valve maintains constant pressure.

The use of only one valve greatly reduces installation and service expense. There is a distinct need for this more efficient and dependable low-side, in the air conditioning field. Its use will increase both your market and profit. Write for detailed information and prices.

GENERAL REFRIGERATION SALES COMPANY

Dept. F-6, Beloit, Wisconsin, U.S.A.

Smart, Attractive INTERIORS Sell Refrigerators

EVAPORATOR DOORS, VEGETABLE FRESHENER and SERVICE DRAWER FRONTS

In our newly developed finishes of Special Alloy Aluminum

ICE CUBE and DESSERT TRAYS
VEGETABLE FRESHENERS
STORAGE PANS

HOOSIER
LAMP & STAMPING CORP.
EVANSVILLE ... INDIANA

Standards for Noise Control & Insulation As Outlined by Lewis

(*Concluded from Page 6, Column 5*)

cleats may be used in lieu of the stiffener angles. The same gauges as specified above shall apply, for circular ducts of diameter corresponding to the given widths.

Heat Transfer Apparatus

17. HEAT TRANSFER APPARATUS. All convectors where condensation might occur when cooling shall have drain pans with tubing running to drip with an air break above a trapped sewer connection or its equivalent.

No fixed spray humidifier or spray humidifier shall be installed above the basement of a building unless there shall have been installed under it a water tight safing graded to a drain, so that in case of leakage or overflow there shall be no danger of water damage to the rooms under the apparatus.

The air velocity through the airway of a spray humidifier or spray dehumidifier shall not exceed 500 linear feet per minute.

Eliminator plates shall be provided for spray humidifiers, for spray dehumidifiers and for evaporator-convectors and shall be made of some especially durable material so designed as easily to be replaced.

Air filters always shall be easily accessible for inspection and removal without danger of spilling dust to leeward of themselves when the substitution is made.

"Item 18," stated Mr. Lewis, "deals with objectionable noise from air-conditioning apparatus and merely emphasizes the suggestions made in our proceedings during many years that the floating of the foundation which carries the apparatus is more effective than merely to attempt to float the apparatus itself especially if there is a belt drive and necessity for anchoring rigidly such a thing as a small electric motor.

"The speed limitations for air velocity in ducts may be criticized as ultra conservative, but again the defense is that these standards cannot take into consideration proprietary devices. Assurance is given that a liberal interpretation by the plan examiner and the Chicago committee will be taken where the effectiveness of the proprietary devices is assured."

Noise Control

18. NOISE CONTROL. All moving apparatus used in air conditioning shall be fastened securely to its own foundations, which should be a single unit for both driver and driven apparatus, and this foundation shall be carried on a noise-inert substance such as rubber in shear, or cork under and around the edges of the foundation, without any direct contact between the foundation and the building structure.

No metal duct shall connect directly to any fan or housing without a sound-inert junction, such as of canvas.

Piping connections from pumps where practicable shall be made with rubber hose, with the machinery on a floating foundation.

Sharp edges of metal facing an air current shall be rounded or streamlined rather than left sharp and rough. Partitions, housings, and large ducts must be so heavy and so well braced that there will be no vibrating or rattling when air is being delivered.

Intermediate deflecting vanes to prevent building up undue pressure and velocity inside the outer curve of trunk line elbows are desirable.

On account of noise danger the following air velocities shall not be exceeded in those parts of the ducts of air-conditioning systems closer than about 50 feet from the room outlets.

Fan outlet..... 1,500 lin. ft. per min.
Trunk duct ..... 1,200 lin. ft. per min.
Through free area of convectors ..... 1,000 lin. ft. per min.

Where fans, motors, compressors, and the like are placed in rooms under or otherwise adjacent to occupied rooms, provision shall always be made to reduce noise transmission. Suggested means are double walls, double ceilings, sound absorbent material, and the like.

Insulation

19. INSULATION. Insulation on pipes and air-ways when heating, is designed to reduce transmission to the surrounding air, and is under no danger of becoming moist except in case of a liquid leak.

Insulation on pipes and air-ways when cooling, in addition to reducing heat transfer from surrounding air to the cooler inside, must prevent the surrounding air from reaching its dew point and thus depositing moisture. The dew point temperatures for conditions of the air around a cool duct or pipe may be read from a psychrometric chart, but are suggested as follows:

This indicates that if a cold surface at 40° F. is permitted to cool the air which comes in contact with its outer surface, to 60° F. and 48 per cent relative humidity there will be a deposit of moisture akin to that which one sees in summer beading the surfaces of uninsulated cold water pipes in basements.

In air conditioning in which refrigeration is used, therefore, all chilled surfaces must be insulated not only as a measure of control of heat waste, but also to prevent damage due to water drip.

For ducts carrying air not colder than 40° F., a ½ inch layer of board or quilt insulation will serve, provided that the chilled areas are all covered so that air does not pass against the cold surface. For housings around evaporators and for spray dehumidifier housings ½ inch of quilt insulation and ½ inch of board insulation with alternating joints and thorough sealing, have given satisfactory service. Cork 1 inch thick properly sealed, gives satisfactory results, especially for spray dehumidifier housings which carry direct expansion evaporators also.

For low side refrigerant piping cork insulation is acceptable, of thickness commensurate with the temperature difference.

For systems which use cold water piped to the convectors for summer only, any anti sweat pipe insulation 1 inch thick, is acceptable. Where the same pipes convey hot water in winter and cold water in summer, a combination insulation shall be used, which will withstand both extremes. Compressed mineral wool has this faculty, though there is evidence that any good quality steam pipe insulation will serve satisfactorily provided that there are no exposed chilled surfaces to condense the damaging dew.

The standards end with pertinent extracts from the city codes covering local requirements as to permits and fees and quotes local rules as to certain safety features. The situation concerning evaporators for chemical types of refrigerant placed in air ducts of ventilating sysatem is not entirely satisfactory and undoubtedly must be clarified soon, Mr. Lewis declared.

Fibre Board Filter Made By American Radiator

NEW YORK CITY—The industrial division of American Radiator Co. of this city has just introduced a new corrugated fiber-board replacement-type air filter.

The filter is composed of two wafers of the corrugated fiber board placed together so that the cellular passages in the two boards, which are cut at a 45° angle, form a V-shaped passage with a 90° angle in it. These cause the air flow to change direction twice.

Three models of the filter are offered. One, for industrial application, has 3/16-in. cellular passages on both the inlet and the outlet sides of the corrugated wafers.

Another, for ventilating in air-conditioning systems where outside air has to be cleaned, has 5/16-in. passages in the inlet wafer with smaller 3/16-in. passages in the outlet wafer.

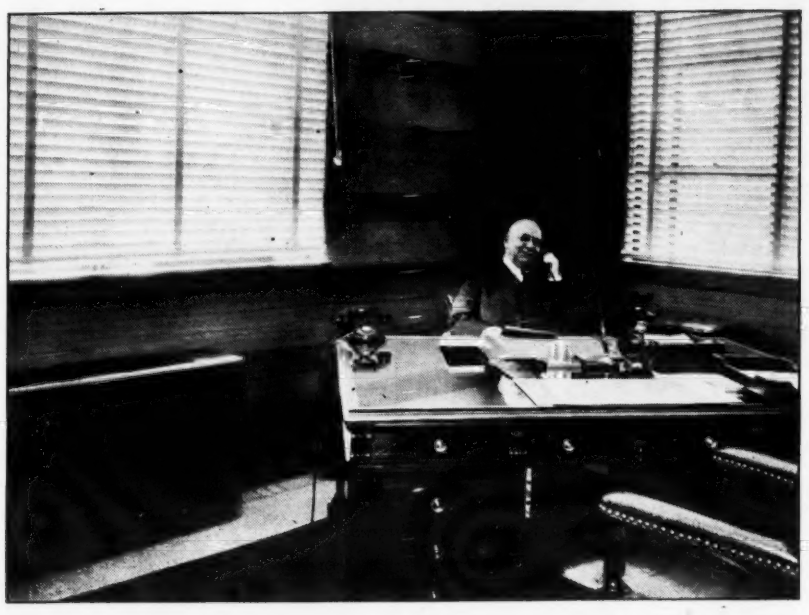
The third, which has been designed for use where the major part of the air filtered is recirculated air, has ½-in. passages for the inlet wafer and 5/16-in. passages in the outlet.

The entire filter is coated with a compound that saturates dust, catching it in the filter. Each dust particle as it is saturated becomes a medium for catching other dust.

Issue Envelope Insert

DETROIT—"Kelvinator Air Conditioning for Perfect Comfort" titles the new envelope insert recently issued to Kelvinator dealers. This folder describes the advantages of Kelvinator's air-conditioning equipment.

Brewery Executive Enjoys Cool Comfort



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Existing Cooling System Used in Brewery Office

EAST PITTSBURGH—Feature of the air-conditioning system recently installed by Westinghouse Electric & Mfg. Co. in the Victor Brewing Co. is that the existing refrigerating plant supplies chilled water to the Westinghouse air-conditioning unit.

Instead of the usual condensing unit, a separate water cooler connected to the brewery's refrigerating plant supplies the chilled water to the unit. The room cabinets provide circulation of cool air; outside air is metered into the unit to maintain correct air "vitality."

N.Y. Restaurant, Dress Shop Are Conditioned

NEW YORK CITY—The Bordewick Restaurant and the Plymouth Dress Shop, located in upper New York City, were recently air conditioned by the Automatic Refrigerating Co. here.

The restaurant rooms, including the lobby, bar, restaurant, and private dining room, are provided with conditioned air at the rate of 7,000 c.f.m.

The existing ventilating system was used in arranging the distribution of the air. Refrigeration is supplied by two 15-hp. low-pressure units. A pair of thermostats in the restaurant operate solenoid valves on the air coolers to control the temperature.

The Plymouth Dress Shop occupies an L-shaped room, at the extreme ends of which space the air-cooling units are located.

Georgia Power Sells 1st Self-Contained Cooler

ATLANTA—The first self-contained air-conditioning unit sold by the merchandise division of the Georgia Power Co. for domestic use was sold by Oscar Layfield of the Brunswick district to A. L. Ferckle for installation in his bedroom. The unit was a Kelvinator SC-55-DU.

Read Drug Chain Will Air Condition 40 Stores

BALTIMORE — Recent air-conditioning activity in this city includes installation of equipment in several stores of the Read Drug Store chain, which plans to air condition its entire chain of 40 stores eventually, and in local branches of the Peoples' Service Drug Stores, Inc., Washington, D. C.

22,223 at Cleveland Air-Cooling Show And Lectures

CLEVELAND—To date, a total of 22,223 people have been told the story of "weather control" in a campaign instituted by the Air Conditioning Bureau of the Electrical League of Cleveland to make the public air-conditioning conscious.

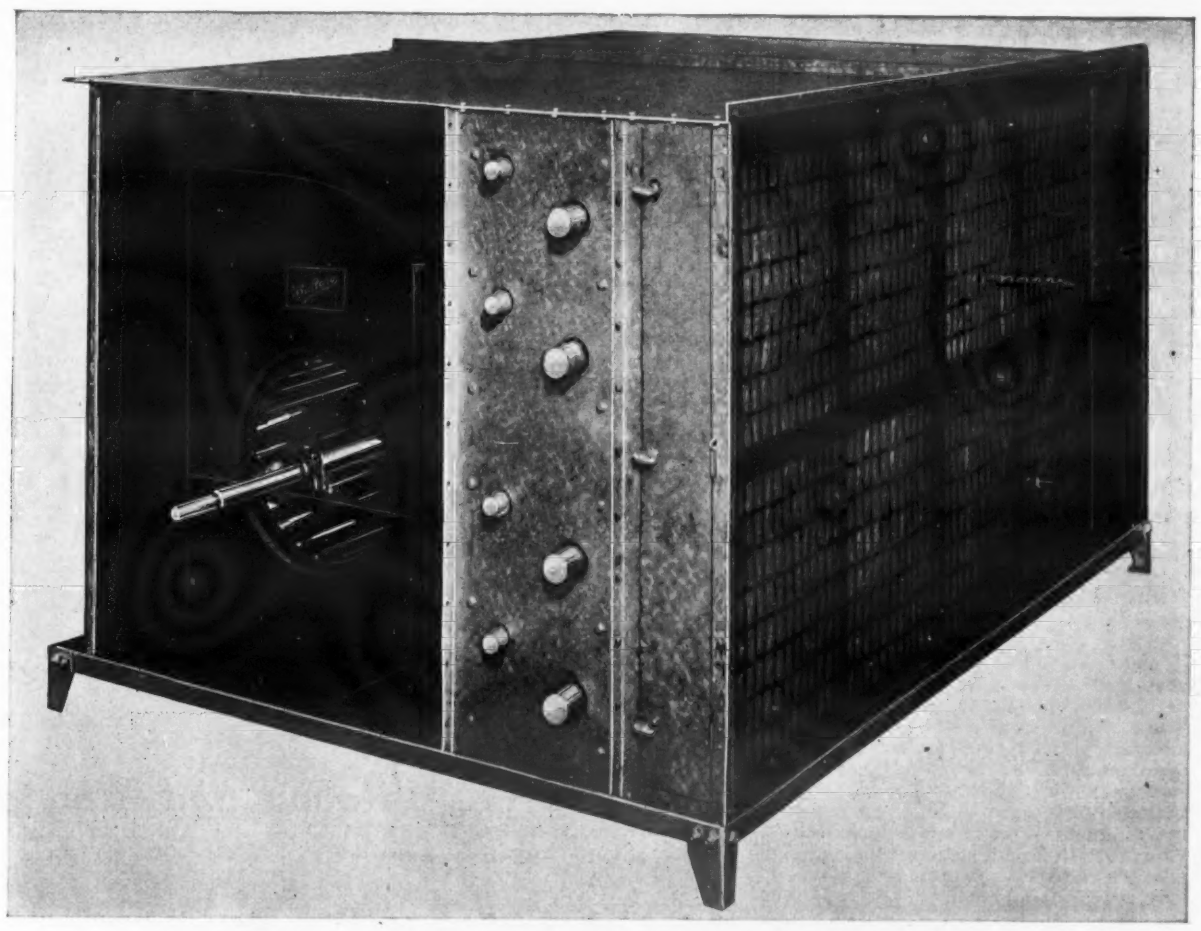
In a series of 109 lectures, which started March 1, a total of 10,675 people, or an average of 3,000 a month, heard the story of air conditioning. Thirty-two additional groups are booked to hear the lectures in the near future. In addition, another 11,548 people have visited the air-conditioning show held in the league auditorium.

In cooperation with the league's attempt to make the public air-conditioning minded, builders are displaying in front of new homes which are being equipped with air conditioning, a sign which reads, "Air Conditioned for Health and Comfort." The signs are 18 in. in diameter, made of steel, and have a background of blue with yellow lettering.

Manufacturers of winter air-conditioning equipment expect to keep 50 of these signs in constant use.

Restaurants, stores, and hotels, throughout the city are also using the league's "Air Conditioned Comfort for Patrons" sign.

Two local air-conditioning companies are equipping a total of 47 Cleveland homes for winter air conditioning. In addition, a total of 25 commercial air-conditioning installations have been made since the first of the year. Commercial installations include two complete floors of the Federal Reserve Bank building and operating rooms of the Lakeside and Mt. Sinai hospitals.



"PC" Cabinet for 24 Ton Cooling Installation—Note Few Coil Connections Necessary

Three-Day Shipment on all standard sizes

We are stocking two standardized "PC" Cabinet arrangements:
(a) Fans, Cooling Coil and Filter.
(b) Fans, Cooling Coil, Filter and space for additional coils (either heating or cooling).

We can also make six- to ten-day shipment on other arrangements, including motors, drives and humidifiers.

We do no installing. Contractors like our "PC" cabinets because the units are practical, — conservatively rated, easy-to-install. They live up-to-expectations, and satisfy the customer.

Write for Bulletin 2968.

BUFFALO FORGE COMPANY, 487 Broadway, Buffalo, N.Y.

"Buffalo" Type "PC" Central Cabinets for Comfort Conditioning

PERSONALITIES

By George F. Taubeneck

Travel Notes from an Editor's Diary

Whew! Just caught that one in time. Now to find the conductor and get a berth assignment. (What was that old gag about the moonstruck couple wandering down the Pullman aisle? "Looking for a berth?" asked the conductor. "Oh, no," blushed the young man, "we're just married!")

Only two more cars to go now, and we'll be in 201. Bet it's named Woonsonahockanhassett. Or Hautzenroeder, maybe. There's an idea: If Katherine Hautzenroeder of Westinghouse would list all the misinterpretations of her name, p'raps she could sell them to the Pullman company for car names.

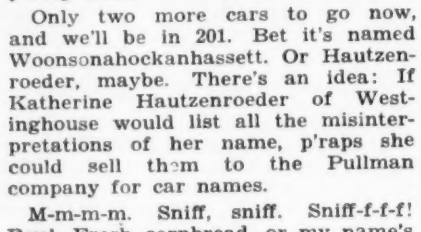
M-m-m-m. Sniff, sniff. Sniff-f-f-f! Boy! Fresh cornbread, or my name's Elmer Beaconschnozzle. Guess I'll have an early dinner tonight. Guess? You know dam' well you will, fella. Cornbread!

Big grin, passing through the diner. I'll be seein' ya, boys. Here's 201. It's Eagle Pass—the Wild West influence again. Some Pullman bigshot must read pulp-thriller mags. Lower 6, eh? One other passenger. Dan'l Willard, it would seem, could use a good promotion man.

Heh. The cullud waitah was all mine after I ordered a double serving of cornbread. Wotta steak! And mushrooms—the "s" signifying heaps of 'em, not just two. That deep-dish rhubarb pie is almost as good as the kind grandma used to make. Note to self: Try to schedule some more B.&O. cooking.

Gosh, the evenings are getting long.

Top Topper



Albert Matsinger, leading "Topper" (over a long period of years) among General Electric refrigerator salesmen, is now operating one of the Judson C. Burns retail stores in Philadelphia.

And the sight of that green, freshly-rained-upon flat country breeds nostalgia. There's a man hoeing a patch of cabbages. Bet that's what Dad's doing right about now. Corn's looking good. Spring wheat, too. Ohio isn't all industrial, after all. It sure looks it from the air at night, though. And from reading the papers you'd guess that the people don't seem to do much but strike. They used to raise Presidents . . .

Sunlight fading now. Well, back to the club car for a good panatella, and maybe some work on the Magnum Opus. (If JACK ADAMS were here, he'd ask: "Who is she?") If I can just ride enough trains, I may get that book written some day.

* * *

Philadelphia

Philadelphia. What this city needs is more up-to-date railroad terminal facilities. And then again, maybe not. Philadelphia is Philadelphia, and perhaps one should change no part of it—lest the whole works come tumbling down.

This is one city I've never written about. I've explored the place time and again, too. P'raps I can revisit a few spots, and check up on some data, tonight and tomorrow, preparatory to presenting a picture of Philadelphia as a market, a place to visit, and a location for a home.

* * *

Waiting for Orders

Not a prospect in the house when the News candid camera peeked around the corner of the G-E appliance showroom in the General Electric Building, New York City, one day last week.

Merchant & Evans—Since 1866

A taxicab really needs flanged wheels to get to the front door of the Merchant & Evans plant—it's alongside a regiment of railroad tracks.

Inside the M&E headquarters one feels like the hero of Berkeley Square, who was suddenly transported back to the previous century. Everything has the appearance of antiquity—even the employees.

Trusted lieutenants whose hair has turned to silver in the service of the Evans family work in unctuous dignity at desks which have apparently been theirs for decades.

As long ago as 1866 the firm of Merchant & Evans was founded, and the establishment is conducted with the gentility and decorum which befits an institution with such antecedents and traditions.

THOMAS EVANS, himself. President of the firm. Chairman of the Refrigeration Division of the National Electrical Manufacturers Association. Man of public affairs. Man of vision. Man of ideals.

Here he seems more the country gentleman, the Virginia landholder, the benevolent chief, than the lion-hearted attacker of public utilities, and champion of small manufacturers' rights.

In his old-fashioned office are World War trophies: rifles, gas masks, helmets, posters. He shows you proudly the first steel trench helmet manufactured in the United States—made by his company.

Merchant & Evans is much more than just a manufacturer of household and commercial refrigeration products. That's really a small part of the business.

Biggest end of Thomas Evans' manufacturing interests has to do with fire protection — automatic sprinkling systems and chemical extinguishers.

They're looking forward to the coming of age of the air-conditioning industry in the Merchant & Evans plant, and in the laboratory some interesting new equipment is on test and in the process of development.

* * *

All's Quiet at 4:15

Atwater-Kent's plant and offices are eye-soothers, all right. New brick buildings, low and well-proportioned. Vines. Expert landscaping. Surroundings of beauty, rather than squalor. Grass, rather than dust and cinders.

F. E. BASLER, general sales manager, busily supervises the preparation of new literature on forthcoming radio models. He has little time to talk, and is quick and frank to say so.

In some sixteen assorted years of reporting we've never run across a man who more completely fulfilled our idea of the perfect gentleman of breeding than Mr. Basler. He has all the requisites—and, we trust, the perquisites, too.

If you should call on Atwater-Kent this summer, go early. The offices close at 4:15 p. m.

* * *

Prosperous Distributors

Philadelphia is the home of prosperous electrical appliance distributors. No other city seems to have *so many* good ones.

Didn't have time to call on but two of them—Judson C. Burns (General Electric) and Trilling & Montague (Norge)—but found both outfits hitting the ball at a fast clip, pushing the saturation marks higher, and *making money*.

Mr. Burns, one of the most beloved-by-his-organization men in the industry, is elated over the Bancredit plan of financing time payments on appliances, by taking advantage of the FHA insurance against repossession losses (see story on page 1).

This scheme, in addition to reducing interest rates, removes the contingent liability bogey from the minds of distributors and dealers who use it. That, says Mr. Burns, is the biggest break he's had in two decades of merchandising.

ALBERT MATSINGER, one of the most successful salesmen of G-E refrigerators in the country (he was a Topper five years in succession—or was it six?) is now a retail sales executive.

We found him in one of the Burns retail stores, looking not an hour older than the first time we saw him up at Association Island. Matsinger says his copies of ELECTRIC REFRIGERATION NEWS look like Shredded Wheat when he's ready to take them home on the evening after their arrival—so many times have they been read, thumbed, and clipped. At least a dozen others read each copy of the NEWS religiously, he swears.

HARRY MONTAGUE of Trilling & Montague had just returned to his office after a long trip when we called, and as a consequence he seemed to be devoting most of the time to answering phone calls from men who had been waiting to talk with him.

Harry feels especially good about the air-conditioning business. Since becoming Carrier dealers in January of this year, their air-conditioning sales have passed the $60,000 mark.

Trilling & Montague also sell Norge ranges and washing machines, Zenith radios, and ABC oil burners. DAVE TRILLING was in Chicago and Detroit last week.

Last year these two entrepreneurs took a caravan of dealers to the Chicago World's Fair. They came back with some ideas, which were embodied in their showy and highly modernistic display room.

The streamlined curve of this attractive room pulls one clear around it like a magnet, so that you just can't miss seeing *all* the appliances they have on display.

* * *

Look for the Motto

When you call on Vice President T. K. QUINN of the General Electric Co. in his offices high above Lexington Ave. in New York City—and must wait for a few moments before being ushered in—make it a point to read the motto by Isocrates which hangs on the wall of the anteroom.

As a definition of successful living, it admits few peers. If the writer were a state superintendent of schools, he'd hang that quotation in every classroom.

* * *

$36 a Look

Another Quinn who makes his headquarters in New York, R. J. QUINN of Mathieson Alkali Co., told us last Friday that it cost him $36 to look at the June 5 issue of ELECTRIC REFRIGERATION NEWS.

It seems that he had told GEORGE BRIGHT that he'd be glad to help out the A.S.R.E. golf tournament at the spring meeting in Detroit. George thanked him, but said no more about it.

And lo! Upon opening the June 5 NEWS, Mr. Quinn discerned that he had donated a set of golf clubs to the second place winner, Consulting Engineer E. T. WILLIAMS!

So he went out and bought a $36 set and presented them to Mr. Williams—who, of course, was grateful indeed.

'It's a Boy!'

Robert Oliver Richards, Jr. is the name of the 8-pound newcomer to the home of the publicity director for the Westinghouse works in Mansfield. This event gives us an opportunity to run the above amateur portrait of the Fond Father (or the Proud Papa, if you like that better) himself. Even in the above picture, which was taken weeks before the Blessed Event, Mr. Richards seems to be taking life pretty seriously.

Looks O. K. to Harry

Harry Montague of the famous Trilling & Montague specialty appliance distributorship in Philadelphia looks hard for a flaw in a new shipment of Norge washing machines, but can't seem to find any.

'Round and 'Round You Go

New streamlined, modern-motif showroom of Trilling & Montague, Philadelphia.

At the End of a Busy Day for a General Electric Vice President

It's after 5 o'clock in the skyscraper office of T. K. Quinn, vice president of the General Electric Co., and still people call him up, asking him to solve problems and give advice on pressing problems. After eight or nine hours of this sort of thing, a man gets a little tired, says Mr. Quinn, but he seems pretty cheerful about it all, at that.

AIR CONDITIONING

Van Alsburg Tells How Grilles & Registers Affect Air-Conditioning Systems

TORONTO, Canada—Registers and grilles affect an air-conditioning system with respect to noise, resistance, volume, flow, and appearance, declared J. H. Van Alsburg of the Hart & Cooley Mfg. Co., in addressing members of the A.S.H.V.E. at their semi-annual meeting here last week on "Characteristics of Registers and Grilles."

A grille, Mr. Van Alsburg explained, is primarily a grating, used to conceal an opening through which air passes, and it has no provision for controlling air volume.

A register, he said, is the combination of a grille and some means for regulating the air flow. A supply grille is one which admits air into a room and a recirculating grille is one through which air is withdrawn from the room.

Testing apparatus used by Mr. Van Alsburg consisted of a blower discharging a volume of air into a horizontal plenum chamber, from which the air passes into a vertical duct which makes a right angle expanding approach to the grille to be tested. Tests were made with typical grilles of standard manufacture, all size 12x6.

Smoke bombs were used to determine the path of the air stream and a standard 4 in. K. & E. anemometer was used for all velocity readings. In making the velocity readings at the register to determine the average velocity, the grille was blocked off in squares with chalk and one minute readings were taken of each block to determine an average for the total area.

All grille areas were based on the Davies Formula, which is as follows for registers:

$$Cfm = CV \frac{A+a}{2}$$

and for this equation CV is a correction factor to be used for various velocities and anemometers of different sizes, A is the gross area of the grille and a is the net area of the opening through the grille, which is divided by 2 to establish the average or effective area.

"Suitable apparatus for accurately determining the cause of noise and its level was not available," stated Mr. Van Alsburg. "The noise level for grilles has been considered 35 decibels but this does not take into consideration the pitch or frequency of the noise and this suggests further research be conducted to determine noise and that improvements be made in the present noise level determination equipment."

However, even without suitable apparatus certain results were obvious from the tests made, Mr. Alsburg declared.

"Design and construction of the ducts, particularly the approach, have much more effect on the noise level than the grilles," he said. "A velocity up to 1,500 ft. can be used without air noise with practically any type of grille, using a standard approach, and by standard approach reference is made to a right-angle turn between the duct and the grille with a change in dimension so the perimeter of the grille flange is larger than the perimeter of the duct, commonly called a riser, to allow slower outlet velocity.

Noise Control

"It is very difficult to eliminate noise in an air-conditioning system with a duct velocity of more than 2,000 ft., which would be necessary if a velocity of 1,500 ft. were recorded at the grille.

"A velocity of 1,700 ft. can be used with perforated grilles, provided the fret work of the grille is not over ¼ in. wide. A velocity of 1,500 ft. can be used with a fin, tube, or bar type grille without causing objectionable noise if the rear surface is flush instead of indented."

Much of the noise caused by the approach, Mr. Van Alsburg explained, can be reduced by the use of turning blades, which allow an increase of 300 ft. for the velocities mentioned, without increasing the noise caused by the grille.

"A properly designed approach," said the speaker, "turning blades and grille in one unit has been constructed, permitting velocities as high as 3,500 ft. without objectionable noise because the air turbulence in the approach and grille was eliminated."

The tests indicated that the resistance caused by the grilles will never exceed 10 per cent of the total resistance of the system, and that therefore grille resistance is of relatively small importance, declared Mr. Van Alsburg.

Change in Free Area

"A change in the net free area of a grille does not have a corresponding effect on volume," the speaker pointed out. "For example, a 10 per cent reduction in the net area will reduce the volume approximately only 5 per cent provided the net area of the grille remains over 50 per cent."

The speaker described "air flow" as the distribution of incoming air into the room. This has to do with the distance the air travels, and the direction and shape of the air stream.

"It is obvious that the correct distribution of the incoming air is an important factor in the comfort of the occupants of the room and it is perhaps in connection with air flow that grilles assume the greatest importance," declared Mr. Van Alsburg.

"It is also in connection with air flow that the performance of different types of grilles vary the most.

"Length of the air stream is governed primarily by the velocity of the air, then by the type of grille, and to a lesser degree, by the proportions of the grille.

"Test results indicated that the air will travel further with a grille having a smaller perimeter than one having a large perimeter, other conditions being the same."

Affects Shape of Air Stream

Direction and shape of the air stream, averred Mr. Van Alsburg, is very much affected by the type of grille, and also by the nature of the approach. If it is desired to project the air on a horizontal plane, the speaker said, it is necessary to either use turning blades in the approach or else use a grille having horizontal bars or fins of sufficient depth to guide the air horizontally.

The air can be readily directed to the left or right by means of the grille, provided that the bars or fins of the grille are sufficiently deep.

Temperature differential has a considerable effect on the rise or fall of air at various velocities. The chart which Mr. Van Alsburg showed indicated that the greater the velocity, the further the air would travel into the room, and that the higher the velocity and higher the temperature, the greater tendency of the air to rise.

For example, air projected into a room at 800 f.p.m. at a temperature of –20° F. falls 4 ft. while traveling into the room 20 ft.; air directed into a room at 400 f.p.m. and 60° F. will rise 5 ft. while traveling 11 ft. into the room; and air entering the room at 800 f.p.m. and 60° F. will rise 8 ft. while traveling 22 ft. into the room.

With respect to recirculating grilles, Mr. Van Alsburg stated that tests have been made which indicate that high velocities may be used through recirculating air grilles without showing an appreciable air movement a few feet away from the grille.

With a velocity of 1,000 ft. through a 12x12-in. grille, the velocity of the air 16 in. away from the grille is less than 50 ft. and with a grille 24x24 in. and a velocity of 1,000 ft., this velocity is reduced to 50 ft. between 24 and 30 in. away from the grille.

Air Conditioning Helps Build Trade of Small Rental Library

KANSAS CITY—A single Frigidaire air-conditioning unit with a capacity of 1½ tons was recently installed in the small 12x24 ft. neighborhood book store and rental library owned and operated by Bennett Schneider in the Country Club Plaza district of this city.

Due to the smallness of the store the unit was installed over the door.

"Before we put in the unit," Mr. Schneider said, "the shop was unlivable. People wouldn't stay five minutes. We let our promotional activities slip because we were too exhausted to do much more than keep the shelves arranged and make our daily bank deposit.

"With air conditioning of the shop, customers began to browse around and in a book store browsing means buying because a customer who will enter a book store is the type who finds it hard to resist purchasing a book in which he has become interested. Sales volume in the summer now rivals that of winter months."

Air-Conditioning Sales Show Big Increase In Chicago

(*Concluded from Page 1, Column 3*)

conditioning division of the Edison company, summarized the history of air conditioning. He pointed out that although air conditioning as a science did not appear until 1902, it had its inception in 1780 when Benjamin Franklin invented the Franklin stove which had a crude water evaporator attachment to furnish humidity to heated interiors.

Today, more than 200 industries have found air conditioning a profitable production tool. The two largest industrial air-conditioning classifications in Chicago are candy and printing, declared Mr. Porter.

"Although the basic principles of air conditioning have been well known for 25 years," he continued, "it is only within the last 10 years that its value in increasing human comfort and efficiency has achieved any degree of public acceptance.

"Chicago is credited with being the birthplace of air conditioning for human comfort. In 1912, the offices of Armour & Co. in the Chicago Stock Yards were completely air conditioned. Chicago can also boast of the first hotel to adopt air cooling for its restaurant and lobby.

"In 1916," he continued, "several theaters in Chicago adopted air conditioning . . . cooling coils were introduced into the ventilating system.

"In 1922, a Los Angeles theater was the first to install an air-conditioning system with humidity control and 1925 saw the first completely air-conditioned theater in New York City. Today 40 per cent of the listed theaters in Chicago have air-conditioning equipment."

Detroit Lubricator's Thermostat Has Two Temperature Range

DETROIT—Detroit Lubricator Co.'s differential thermostat No. 691 is being supplied in either a Northern range corresponding to the American Society of Heating & Ventilating Engineers "comfort curve" or a Southern range which Detroit Lubricator engineers have worked out, reports I. J. Knudson of that company.

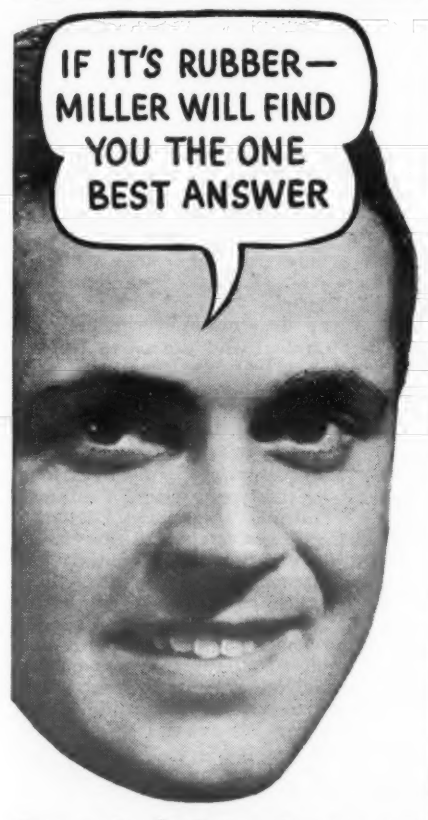
The A.S.H.V.E. "comfort curve" marks very closely the relative amount of cooling needed in the Northern part of the country to assure comfort indoors during the hot weather, Mr. Knudson stated, but declares that it is generally recognized that the temperature range represented by this curve is too low for maximum comfort throughout the Southern states.

Thus the "Southern comfort curve" was developed and the range incorporated in the Detroit Lubricator thermostat.

By a simple factory adjustment, these temperature ranges may be shifted up or down slightly if desired. This adjustment, when made, changes all points on the curve by an equal amount.

25 Utility Salesmen Visit Electromaster Factory

DETROIT—As an award in a sales contest, a group of 25 salesmen from the Dayton Power & Light Co., Dayton, and the Union Gas & Electric Co., Cincinnati, were recently given a trip to the factory of Electromaster, Inc., manufacturer of electric ranges and water heaters of this city.



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TEN years of close cooperation have made Miller's technical staff part of the electric refrigeration industry. We know your problems. We have helped solve many of them. Sponge rubber, for instance. Improvements developed by Miller are performing valuable service for leading manufacturers, in new uses of sponge rubber. Our consulting service is yours for the asking. Just write Miller Rubber Products Co., Inc., Akron, Ohio.

OUR EXPERIENCE
WILL SAVE YOU
TIME AND MONEY

Miller

ALL DELCO MOTORS HAVE BURNISHED SHAFTS

For an electric motor bearing to be really long-lived, the shaft which revolves in the bearing must be unusually smooth. In Delco motors, smoothness of the shaft is assured by burnishing in a special machine developed by Delco engineers. This operation insures long bearing life, permits the maintenance of close clearances and reduces friction loss to a minimum. This is only one of many special processes which help to make Delco motors the outstanding choice of household appliance manufacturers. Delco Products Corporation, Dayton, Ohio.

Made in Canada by the McKinnon Industries Ltd.
St. Catharines, Ontario

DELCO MOTORS

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If You Use It— You Can Sell It

DURING the past year the entire staff of ELECTRIC REFRIGERATION NEWS has had an opportunity to learn something about air conditioning from first-hand, personal experience. No one knows better than we do that we have a lot more to learn. But at least we have moved past the stage where air conditioning is merely a subject for conversation, a speculative theory, or something we have read about in a book.

The air-conditioning system installed and operating in the home of ELECTRIC REFRIGERATION NEWS is not perfect by any means; but it is working, and we are learning, every day in the year. We are now installing a new system in our new building (which adjoins the old), and we believe that the new system will be a considerable improvement. In the meantime, we are making some alterations in the equipment installed last year. We have made some errors, and we are learning how to correct them.

It is true that the outfit has cost a lot of money, probably more than most property owners would be willing to spend, under present business conditions, and at this stage of air-conditioning development. But we believe that the expense is justified, not only in terms of educational value to us (with due regard to our special interest in the subject), but also in terms of health and office efficiency.

The effects upon our office workers were easily obvious during the hot days last summer. More important economically, we believe, were the amazing results—in terms of efficiency and improved attendance of the staff—secured during the winter months. In fact, we are more impressed with the health features (as directly related to payroll costs) of air conditioning in winter than those experienced during the summer. That viewpoint is based, of course, upon conditions in Detroit—where we have many more days during a year which require artificial heating than days which need artificial cooling.

Unfortunately, we have no adequate records which would show the actual office time lost in previous years due to absence of employees suffering from throat and nasal ailments. We know well enough that a great many of the employee-days lost every fall and winter were directly traceable to colds and sore throats. We also know that many ailing employees who "put in the time," when they were low in vitality and equally low in accomplishment, might just as well have been home.

So, even though we lack an impressive array of figures to evaluate this element of loss, we know that it has represented a really important percentage of total expense. The staff of the NEWS averages about 40 persons, and the direct weekly payroll represents nearly one-half of the total cost of operating the business.

All last winter there was scarcely a cold in the office. It was rare, indeed, that a member of the staff had to take time off because of illness. Moreover, the general office morale, efficiency, and tempo was the best in years. Possibly other factors entered into the making of this condition; but in our minds there is no doubt but that air conditioning saved the company money last winter in the following ways: (1) Considerably lessened number of employee-days lost because of illness; (2) Fewer on-the-job employees slowed up because they were not feeling well; (3) Increased efficiency on the part of decidedly healthy employees who probably wouldn't get sick under any conditions; (4) Improved morale and speeded-up handling of routine on the part of the entire office staff.

The comfort of summer air conditioning, of course, was no surprise. One unexpected observation was made, however, during mild weather. When it seemed just right outside, the air inside didn't seem so good in comparison. This condition, we eventually came to believe, was due chiefly to too much recirculation of the air. In the air-conditioning system for the new addition to the offices of the NEWS, it is planned to take care of such situations by using no recirculated air during times when it is pleasant outdoors.

Put briefly, it won't be necessary for enthusiastic sales managers to sell the editorial staff of ELECTRIC REFRIGERATION NEWS on air conditioning. We could write testimonials for it ourselves, and probably will, in subsequent issues. Moreover, we have come to one very definite conclusion, a conclusion which might be interpreted as a piece of friendly advice to all air-conditioning dealers: If you want to be able to sell air-conditioning equipment intelligently and well, install it in your own offices and homes. After you have learned through your own experience what air conditioning can do, it should be much easier to get the idea across to prospective customers.

Air Conditioning Standards

IN this issue of ELECTRIC REFRIGERATION NEWS the codification of a set of standard installation practices for air conditioning in the city of Chicago is reported in considerable detail. Although this set of standards is sponsored by labor union interests in Chicago (which generally seem inclined to throw obstacles in the paths of new industries and business interests), and although many competent engineers have criticized specific features of the standards, it does seem to progressive elements in the industry that this is a step in the right direction.

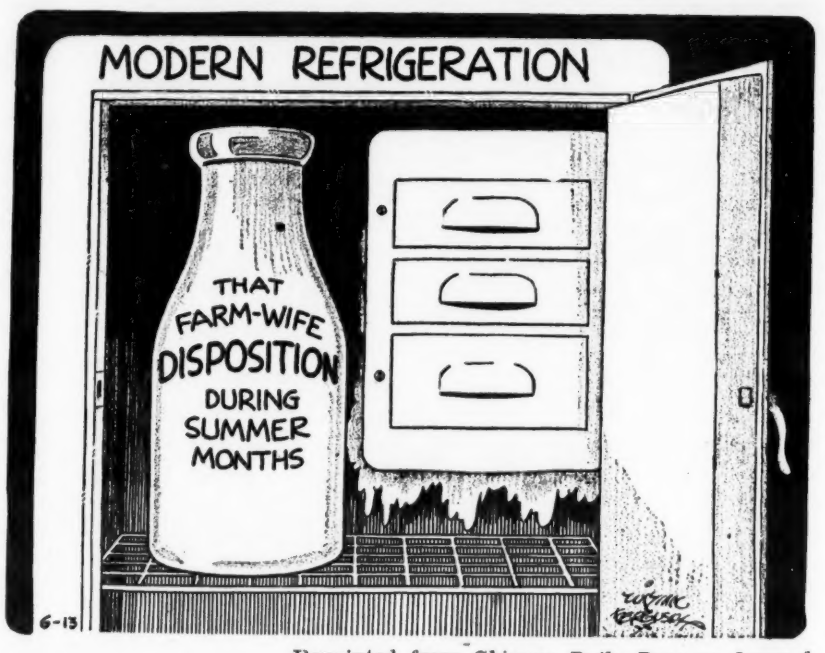
Frequently the NEWS has pointed out the dangers which attend the helter-skelter development of an industry composed of so many diverse and divergent elements, and has suggested that agreement upon installation standards might help keep air conditioning out of pitfalls which have impeded the progress of other new industries. In the March 27 issue of the NEWS, for instance, the editorial declared:

"Establishment of some sort of 'red seal' plan of standard installation practices would go a long way toward preventing destructive price-cutting, thus allowing the infant air-conditioning industry to continue its progress without inviting financial disaster for numbers of concerns which have entered the picture.

"Today one of the principal stumbling blocks in the path of a good sales volume for air-conditioning equipment is the fact that when bids are submitted on a job they frequently seem to bear no relation to one another. The prospective purchaser is stumped. He doesn't know whom to believe, and often comes to the conclusion that none of the bidders knows what he is talking about. Hence he postpones placing his order until the industry has 'settled down,' and until air conditioning 'gets out of the experimental stage.'"

The Chicago standards, it should be noted, are not binding on anyone; but they do offer a "seal of approval." It may be that these standards can be improved upon; and in the course of evolution it seems probable that they will be. But the sooner something like a "seal of approval"—to which an unversed buyer can pin his faith—is available, the sooner the general public will be likely to consider that air conditioning has "arrived."

'Helping to Keep It Sweet'



Reprinted from *Chicago Daily Drovers Journal*

LETTERS

Service on Majestics

Hockett-Cowan Music Co.
1253 Fulton St., Fresno, Calif.

Editor:

We have quite a problem in regard to servicing Majestic refrigerators which we sold the last two or three years. We would like to know if you can suggest any solution. We know you are entirely familiar with the situation and probably know how some of the dealers have solved the problem or you may have information in regard to some manufacturer who has taken advantage of the Majestic situation and has provided some plan.

Possibly there is some other unit that could be substituted for the Majestic without too great a cost. Our problem is that many of these were sold with a three-year guarantee. While our customers on a whole are reasonable in regard to that, we are at least obligated to give them as cheap and as good a service as possible.

C. F. COWAN.

School at a Factory?

311 W. Grace, Richmond, Va.

Editor:

I have heard that there is a factory in Detroit where the parts are made, for cooling systems—At this plant one is admitted—and taught the method of installing such systems, free of charge. Of course the student pays his own expenses and receives no salary. I understand that it requires three months at the factory, and three months in an agency, and after that time one is likely to be placed with some agency, of course, if competent. All this is just what I hear. I would like any information you can give. In fact I'd be most grateful for it. The question column in the *News Leader*, here, referred me to you.

JAMES S. SMITH.

Reporter Without a Pencil

C. Hoffberger Co.
Coal—Ice—Fuel Oil
Monument & Forrest Sts., Baltimore

Editor:

Seeing your write-up in the June 12 issue of ELECTRIC REFRIGERATION NEWS brought to mind the pleasant conversation which we had. I don't remember your taking any notes when we were sitting together and I have got to hand it to you, you are a reporter.

M. M. MILLER,
Refrigerator Dept.

Outstanding Industry

American Z Corp.
245 Scio St., Rochester, N. Y.

Editor:

After my return from Detroit back to my office, I want to write you to tell that I enjoyed very much the evening at your new home.

I certainly want to congratulate you on the splendid reception you gave to the members of the American Society of Refrigerating Engineers, and I particularly was impressed with the friendly atmosphere which prevailed that evening.

I also would like to take this occasion to say that I consider your paper outstanding in the field of small refrigerators, and glancing through the pages of it every week, I become convinced that refrigeration is one of the outstanding industries and has a splendid future.

I wish you continued success.

M. T. ZAROTSCHENZEFF,
Technical Director.

Invaluable Supplement

417 E. Spruce St.
Sault Ste. Marie, Mich.

Editor:

I am studying mechanical refrigeration with the Utilities Engineering Institute of Chicago and find Mr. Newcum's articles outlining the servicing of different units invaluable supplement to my course.

In my opinion everybody connected in any way with the refrigeration industry should not be without ELECTRIC REFRIGERATION NEWS.

STEPHEN H. HIBNER.

BOOKS

'Porcelain Enameling'

Author: Andrew I. Andrews, Professor of Ceramic Engineering, University of Illinois. Publisher: The Twin City Printing Co. Edition: 1935. Pages: 392.

JUST off the press, this new book deals with the preparation, application, and properties of vitreous enamels. The primary motive underlying the preparation of this book, according to the author, was the presentation of the technology of enameling in a systematic manner suitable to the needs of both the industrial man and the student.

The term enamel, as used in the book, refers to a thin layer of glass fused onto the surface of a metal.

First chapter of the book gives a short history of enameling, and discusses briefly the era of transition of enameling as an art to enameling as an industry.

After the first chapter, the book is purely technical and discusses fundamental considerations, formulae, and processes for the various steps of enameling.

Chapter two deals with raw materials for enamels. Chapter three explains fundamental considerations such as physical properties of enamel glasses, thermal expansion, density, elasticity, tensile strength, hardness, specific heat, thermal conductivity, crushing strength, opacity, etc.

The next chapter is devoted to the chemistry of cast iron, sheet iron, and steel, and the design of the castings for enameling. Chapter five discusses the preparation of metal surfaces for enameling, including annealing, scaling, chemical cleaning, electrolytic cleaning, etc.

Enamel calculations are thoroughly discussed in the following chapter.

Enamel compositions, as discussed in chapter seven, are divided into four large groups as follows:

"a) Sheet iron or steel enamels, (b) Dry process cast iron enamels, (c) Wet process cast iron enamels, and (d) Jewelry enamels." The author explains in detail the compositions and processes in the various divisions.

Chapter eight is devoted to frit making. Frit making, according to the author is divided into three divisions: raw material preparation, smelting, and frit handling. The author discusses the principal operations and control methods throughout the process of manufacture.

Theories and operation of ball mills, mill room equipment, milling operations and control, and mill additions are described in chapter nine.

Chapter ten deals with the methods of application and control of enameling, including equipment, operation, drying and brushing, and decoration.

The author gives detailed information on firing and furnaces in chapter eleven. The final chapter is entitled "Enamel Properties and Tests" and deals with thermal properties, optical properties, physical and mechanical properties, chemical properties, and defects.

'Two Heads Better Than One,' So Davidson Supervisors Help Salesmen 'Close'

KANSAS CITY — The old adage, "two heads are better than one," is increasing sales of electric refrigerators for the Davidson Furniture Co. here by more than 15 per cent, reports G. Jesse, manager of the store's electric refrigerator and appliance department.

"We do not advocate the switching of prospects from one salesman to another," says Mr. Jesse. "That is not the idea on which our plan is based. In my opinion, that type of procedure makes the prospect suspicious of high pressure, fly-by-night schemes — and loses him more often than it makes a sale."

"Our system is designed to further the closest cooperation between salesman and supervisor, so that the two of them together can close the sale."

Sales Closed in Display Rooms

Under the Davidson Furniture Co. plan, little effort is made to sell a refrigerator in the prospect's home. All salesmen are required to have cars, and the company has sales and display rooms located at strategic points throughout the city.

The store operates three such display centers, and maintains a sales staff of 15 men, including three supervisors. Salesmen work on leads furnished from the floor, as well as from the store's customer list.

The original call on the prospect is in the nature of a friendly discussion of electric refrigeration in general. No attempt at selling is made.

Invited to Showroom

The salesman does, however, try to induce the prospect to designate a time at which he will come into one of the display rooms, where the features of the store's line of electric refrigerators can be explained.

Importance of the friendly first call, Mr. Jesse says, is that it gives the salesman a chance to size up his prospect, his kitchen, and his pocketbook. When he brings the prospect into the showroom, the salesman should have a pretty accurate idea of what the person would be most apt to buy.

And here Mr. Jesse's "two heads" system begins.

"The salesman introduces the prospect to the supervisor, who cooperates in closing the sale. This requires considerable selling ability and tact on the supervisor's part, but I have found it results in more sales than was formerly the case in the direct home call by a single salesman," Mr. Jesse says.

Concentration on Refrigerator

"Then, too, the salesman's talk is made more convincing by having before his prospect's eyes the things he is talking about. Distractions which often occur in home calls are eliminated, and attention is concentrated on one thing—an electric refrigerator."

Another of Mr. Jesse's principles is that every man likes to be a winner. The sales stimulus of a contest, he has found, is pretty sure-fire. The Davidson store has some sort of contest going all the time, starting a new one every week.

"To accomplish the psychological purpose of a contest," Mr. Jesse says, "it is not necessary to have expensive prizes. We generally give our salesmen something in the way of wearing apparel that runs to only a few dollars."

Prizes are based on a dollar-and-cents sales basis, with separate prizes for floor men and outside men who rank highest. All prizes go to individuals rather than to teams, although a separate prize is offered each display room selling group, so that the competition is among the men in each group rather than between teams.

Mr. Jesse was transferred to the refrigeration and electrical appliance department managership of the Davidson Co.'s store recently, after having been branch manager of the company's store in Kansas City. In this capacity he succeeds J. Gannon, who resigned to become sales promotion manager of the Oklahoma Tire & Battery Co., Tulsa, Okla.

'Fight Higher Food Costs' Is Theme of Westinghouse Drive

MANSFIELD—"Fight higher food costs with a Westinghouse refrigerator" is the theme of the summer sales campaign launched Monday by Westinghouse Electric & Mfg. Co. The sales drive, designated as the "Call to Colors" campaign, started June 17 and will run to Aug. 10.

In its advertising for the campaign, Westinghouse points out that a staff writer of the *New York World Telegram* reported that the average family spends $3.31 more per week for food than it did two years ago, and $1.65 per week more than one year ago (figures based on a survey made by the Brookings Institute of New York).

R. C. Cosgrove, manager of household refrigeration sales for Westinghouse, explains that, "The figure of $3.31 per week is based on a weekly expenditure in 1933 of $13.80. Surveys indicate that this has risen in two years to $17.11, an increase of 24 per cent."

The entire sales drive is based on the story of economy through the use of electric refrigeration.

The five successive stages of attack projected by the HCL (*High Cost of Living*) Plan are as follows:

First move in the campaign is to lead prospects into a discussion of the rising cost of food by means of a small shopping guide called the "Mark-it-er." The "Mark-it-er" is a round, notched kitchen and shopping card which lists about 100 different food items in fan-shaped spaces. A string attached to the center of the card is wound around the projections to mark items of food to be purchased by the housewife. On the reverse side of the "Mark-it-er" are listed four methods of saving with Westinghouse refrigeration.

Second move is visual presentation. An indexed pocket-size demonstrator, called "What to Do About Rising Food Costs," discusses facts of increasing food costs, gives methods of saving, and calculates, by means of a sliding chart, from the prospect's own figures how much her food costs have increased since 1933, and how much an electric refrigerator can save her.

The third step is a word-for-word demonstration to the prospect of an actual model, which places emphasis on features that especially relate to the economy story.

Move number four is the demonstration to the prospect of the Food Savings Proposal Form, and the new Food Price Sheets. The Food Price Sheet lists staple foods and their comparative prices—quantity buying, "bargain special" buying, and regular buying.

A space is provided to show how much can be saved by quantity and bargain buying. The salesman figures out how much the prospect can save through quantity food buying, no ice, etc. and offers the results to the prospect as the "proposal" to provide money for the purchase of a refrigerator.

Final move is the use of the Westinghouse Meter Bank. The meter bank is offered in connection with an FHA loan. If the customer is not eligible for a loan under the Federal act, the bank is presented as a means of accumulating monthly savings to apply on a refrigerator.

Two full-page, full-color advertisements in the *Saturday Evening Post*, plus newspaper advertising, outdoor and indoor displays, direct mail, radio broadcasts, and publicity stories—all tying in with the selling theme—are being utilized.

Other sales helps include window and outdoor displays for dealers, a full-line folder, and an envelope stuffer, which may be obtained from the Westinghouse company.

All McDavid Dealers Are Ahead of Quota for 1935 Sales

BIRMINGHAM, Ala.—Spring sales for R. P. McDavid & Co., Inc., Kelvinator distributor here, were 646 per cent ahead of the same period last year, reports B. C. McCoy, wholesale sales manager. Every town in the territory, including the 11 Birmingham dealers, is over its quota now.

Key to the increase in sales, believes Mr. McCoy, is the series of cooking schools conducted in Birmingham and the small towns every week of the spring season by Mrs. Lucille Martin, McDavid's home economist.

The Cooperative Newspaper Cooking School conducted by Mrs. Martin in Decatur, Ala., was the first held there in two years. Thomas Furniture Co., Kelvinator dealer, cooperated with the Decatur daily paper in a two weeks' preliminary campaign to enlist merchant cooperation and public interest.

Sessions were held in a large store building, the audience later going to the dealer's showroom for Kelvinator dessert and favors, and to see the new refrigerator models. On the last day the grand prize, a 1935 Kelvinator was awarded.

A similar school was conducted by Mrs. Martin at Alexander, Ala. George Gogans, Kelvinator dealer, closed nine sales on a single Saturday following the school, in a town having an electric rate of 10 cents per kwh.

LaSalle & Koch Reports Refrigerator Sales Gain

TOLEDO—Refrigeration sales for LaSalle & Koch Co., local department store, are 20 per cent ahead of last year, states Dean W. Griffin, in charge of the refrigeration department.

Radio Program with Electric Kitchen as Feature Builds Sales

OMAHA—That radio programs featuring electric kitchens are an effective business producing medium, is the firm belief of Electric Housekeeping, Inc., G-E distributor here, sponsor of daily hour-programs over stations KFAB, KOIL, and KFOR.

These daily programs are broadcast from the complete G-E kitchen in the distributor's showroom through a cooperative arrangement with the Radio Center, owner of the stations. The stations assume the cost of broadcasting and furnish the speaker and director of programs, who is Mrs. Grace Steinberg.

Main feature of the radio kitchen program, which is the Recipe Exchange Service, was originated by Mrs. Steinberg.

Miss Evelyn Johnson, home economist for Electric Housekeeping, Inc., takes care of the demonstration and preparation of food in connection with the broadcasts.

Daily attendance at these broadcasts, which are open to visitors, averages about 40 women. Programs are arranged so that some guest announcer of national importance is on the program at least one day every week.

To promote attendance at the broadcasts, prizes are offered, and the food prepared in the demonstrations, is served to the guests.

Popularity of the Recipe Exchange Service is evidenced by the hundreds of letters, expressing appreciation for the recipes and household hints, which Mrs. Steinberg receives from all parts of Nebraska, Iowa, Missouri, Kansas, Minnesota, South Dakota, Wisconsin, and other points in the United States and Canada.

Department Stores to Get 30% of Volume In 1935— Cameron

CLEVELAND — Department stores this year will account for 25 to 30 per cent of electric refrigerator sales, it is predicted by Ralph C. Cameron, manager of the department store division of General Electric's specialty appliance department.

"Each year has seen an increase in the volume of electric refrigerator sales by department stores," he says. "This year will be no exception. Our sales through department stores have thus far shown an increase over previous years and we expect a corresponding increase during the remainder of the year.

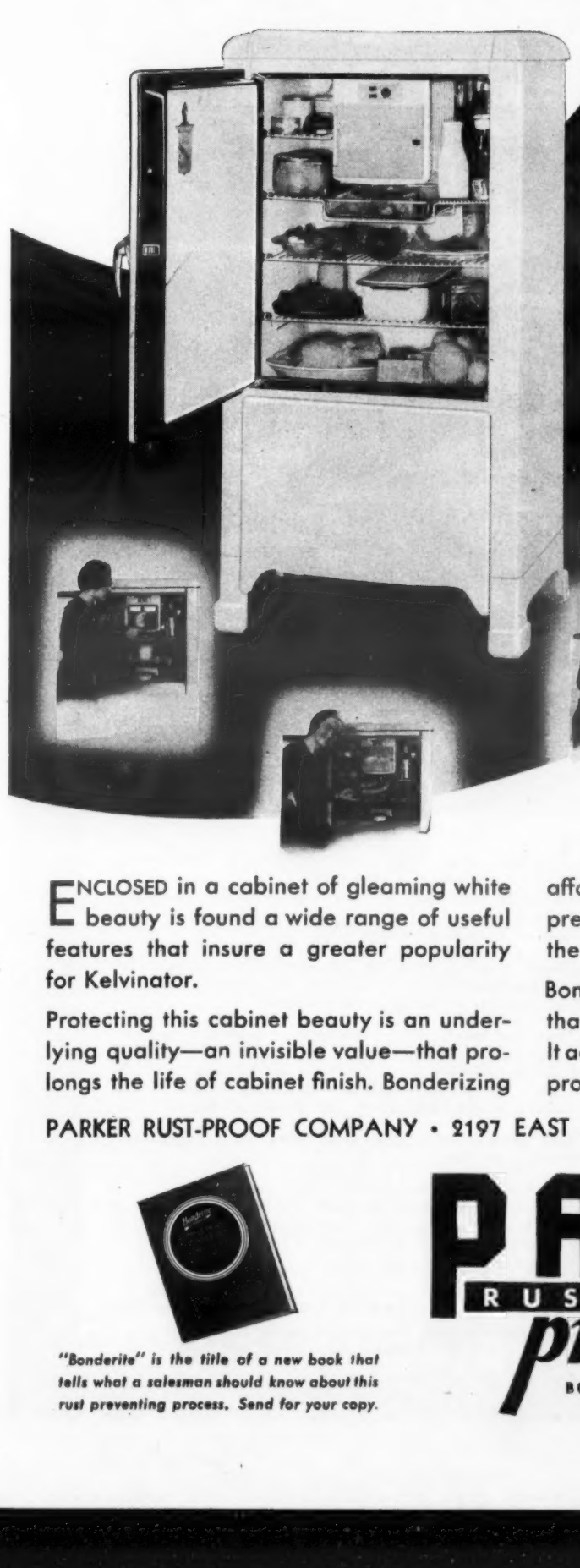
"The electric refrigerator, of course, is not, as yet, an over-the-counter piece of merchandise, but it rapidly is approaching the status of a demand article. However, it still is necessary for department store appliance departments to follow up prospects, if the store is to get 100 per cent sales results on prospects which are developed in the store.

"In other words, prospects who become interested as a result of a voluntary visit to the department store can be sold if salesmen will follow them up with calls on them at their homes. A certain amount of outside selling of this sort will boost department store sales. It has proved out in the case of many stores."

Mason Is Director of Board of Commerce

DETROIT — George W. Mason, president of Kelvinator Corp., was chosen as a director of the Detroit Board of Commerce at the annual election held here recently.

KELVINATOR



ONE OF THE FIRST USERS OF BONDERIZING FOR REFRIGERATOR FINISH PROTECTION

ENCLOSED in a cabinet of gleaming white beauty is found a wide range of useful features that insure a greater popularity for Kelvinator.

Protecting this cabinet beauty is an underlying quality—an invisible value—that prolongs the life of cabinet finish. Bonderizing affords a firmer foundation for the enamel, prevents chipping and peeling and stops the spread of rust around scratch or dent.

Bonderizing provides an extra selling feature that the salesman can use to great advantage. It adds extra years to the life of the finish and prolongs the owner's pride of possession.

PARKER RUST-PROOF COMPANY • 2197 EAST MILWAUKEE AVE. • DETROIT, MICH.

"Bonderite" is the title of a new book that tells what a salesman should know about this rust preventing process. Send for your copy.

PARKER RUST-PROOFING processes

BONDERIZING • PARKERIZING
SPRA-BONDERIZING

AIR CONDITIONING

Conditioning of Fermenting Rooms, Design And Insulation of Ducts Were Chief Problems in Brewery Jobs

TORONTO—Air conditioning of an ale brewery was described by C. P. Creighton of the firm of McDougall & Friedman, consulting engineers, at the second technical session of the A.S.H.V.E. meeting here last Tuesday.

Mr. Creighton's paper was derived from actual experiences in the air conditioning of a Montreal brewery.

The fermenting room of an ale brewery is undoubtedly the department in which an adequate cooling and ventilating system is most important, declared Mr. Creighton.

"It has been found," he said, "that even temperature and humidity in the fermenting room tend to greater uniformity of the product both as to quality, flavor, and rate of fermentation.

"The clean filtered air lessens the danger of contamination of the brew by air borne wild yeast cultures, mould spores, or other organisms, while the dryer air of the room lessens the condensation of walls and other apparatus with consequent reduction in mould growing.

Saving in Building Maintenance

"Less condensation on the walls makes possible a considerable saving in maintenance of the building due to the greater life of paint work and less necessity for disinfecting.

"In the winter, when heating is required with consequent necessity of added humidity in the air, the drying out of empty tuns is retarded and yeast remains in a much healthier condition.

The four fermenting rooms to be air conditioned were all figured for the same inside and outside conditions, Mr. Creighton explained. Inside temperatures were to be maintained at 55° F. with a relative humidity of 70 per cent. Outdoor conditions were assumed as —20° F. in winter, and 90° F. and a relative humidity of 70 per cent in summer.

The design of the whole plant made provision for the introduction at all seasons of a maximum of 2,500 c.f.m. of outside air for ventilation. The fans and ductwork were designed to recirculate 28,000 c.f.m. per minute.

During the process of fermentation, said Mr. Creighton, sugars in the wort or unfermented ale are acted on by the yeast and converted to alcohols and carbon dioxide gas with consequent production of heat. Most of this heat is carried off by cold water circulating in copper coils inside the fermenting tuns.

Rate of Heat Production

There is, however, a certain amount of heat and moisture thrown off from the surface of the fermenting ale. There is also a large amount of carbon dioxide gas produced, this gas flowing over the edge of the tuns into the room. The rate of fermentation is controlled throughout the process by varying the temperature so that heat and gas are produced at a varying rate at different periods throughout each brew.

"Rate of production of heat was calculated from the known rate of change of sugar into alcohol and gas and the amount of heat carried away by the cooling water measured and deducted," explained Mr. Creighton. "The difference was assumed to be the heat lost to the air of the room either by convection or the evaporation of moisture.

"Production of carbon dioxide gas during fermentation was calculated in a manner similar to that indicated for the production of heat and was also built up step by step for successive brews.

Take CO_2 Gas Out

"Owing to the steady orderly production of the gas, the concentration near the floor was very high, sometimes reaching 5 to 6 per cent at heights of 6 inches or less, although decreasing 2 or 3 per cent at the breathing line. By taking advantage of this condition and exhausing air from the rooms at very low levels while recirculating air from a point near the ceiling, the amount of air from outside necessary for ventilation was greatly reduced with consequent saving of heat and refrigeration."

The air-conditioning equipment in the plant which Mr. Creighton described consisted of duplicate circulating fans; a dehumidifier unit with by-pass ammonia cooling coils, water sprays, and duplicate water circulating pumps; preheater in fresh air inlet, filter in fresh air inlet; reheaters in supplies to each room, and automatic control thermostats, dampers and diaphragm valves.

Apparatus in Central Chamber

All this apparatus is located in a conditioning chamber to which all return ducts are brought. This chamber is brilliantly lighted and has large glass windows for observation and display.

Temperature of air delivered from the dehumidifier is controlled by a thermostat in the return duct from the room which requires the greatest temperature differential between supply and return when cooling, and least when heating, the speaker explained.

Individual reheaters in the ducts supplying two of the rooms are controlled by thermostats on the return ducts from these rooms. The reheaters also serve as heaters for the rooms in the winter.

No separate fresh air fan is provided, the duct being connected to the inlet of the dehumidifier and the quantity being kept constant by a velocitystat located in the inlet and controlling the suction on the dehumidifier. Filters of the dry type are employed to clean this air before it enters the sprays.

Duct Work Unusual

"The duct work of the installation presents several unusual features," stated Mr. Creighton. "Owing to the fact that the system had to be installed in an existing building, it was impossible to provide for the concealment of ducts. Thus it was necessary to run ducts on the ceilings of rooms over the top of fermenting tuns.

"It was considered that there was danger under certain conditions of ducts sweating and dripping into these open tuns with the possibility of contamination of the product which might possibly ruin a brew. As the raw material is of considerable value and as such contamination might also cause great inconvenience, it was decided to build all such exposed ducts of insulating material.

"A composite material consisting of two ¼-inch layers of hard abestos board with ½ inch of wood fibre board between was chosen. These sheets were fastened together with galvanized angles, strips, and bolts. All main ducts, vertical and horizontal, were made large enough for a man to crawl through for cleaning.

"Vertical supply drops exposed in the room were constructed of polished No. 14 gage aluminum. Large vertical ducts were fitted with permanent steel ladders inside to aid in cleaning and vertical supply drops arranged so that a long handle brush could be pushed up from the bottom.

"Air distribution was controlled by numerous volume dampers rather than by duct sizes as the dimensions necessary for cleaning were often much larger than necessary for the quantity of air. In addition, duct sizes were chosen so that standard sheets of the insulated boards could be cut without waste."

Cost of Duct Work More

According to Mr. Creighton, the cost of this duct work was about double that of sheet metal, but little if any greater than the cost of metal duct covered with insulating material.

With reference to conditioning other rooms in the brewery, Mr. Creighton stated that in the hot wort cooler room it is the usual practice to run the hot liquid over the pipes of a Baudelot type cooler, which serves the dual purpose of cooling and aerating the wort. Since the liquid is at boiling temperature when it flows into the cooler, a large amount of vapor is released necessitating powerful supply and exhaust fans for its removal.

In this room, the speaker said, the supply air should be filtered to prevent contamination of the wort by dust, wild yeast, or bacteria. Care must also be taken, he warned, to keep only a very slight plenum in the room in order to avoid driving moisture into the building construction.

Heaters for this air, preferably thermostatically controlled, are desirable in order to reduce fog in the room and to dry up condensation on the walls.

Mr. Creighton pointed out, in concluding his paper, that heat losses checked by the quantity and temperature of air delivered and recirculated from the rooms checked very closely with the design figures.

Cooling Load Cut by Heat-Absorbing & Resisting Glass

TORONTO, Canada—A reduction in the cooling load varying from 9 to 28.5 per cent was observed in an air-conditioned test house equipped with heat-absorbing heat-resisting glass used as an outside window with ordinary glass in the inside sash. W. W. Shaver, Corning Glass Works physicist told A.S.H.V.E. members at their semi-annual meeting here last week.

Mr. Shaver outlined the process by which heat-absorbing glass is effective in preventing a considerable portion of the solar energy from passing through the window as follows:

Sunlight Reflected, Absorbed

"Sunlight falling on any glass window is partly reflected, partly absorbed, and the remainder transmitted directly into the room. Amount of the reflected energy varies with the angle of incidence, being about 8 per cent for clear glass at normal incidence, and insofar as the interior of the building is concerned this reflected energy is effectively lost.

"The energy that is absorbed by the window heats the glass, which in turn dissipates this heat by conduction, convection, and radiation in all directions, the temperature of the glass meanwhile rising until the heat lost by this process is equal to that absorbed.

"Thus, with single windows, in quiet air, approximately one-half of the energy absorbed by the glass finally enters the room through this secondary re-radiation process.

"Now, ordinary window glass absorbs only about 4 per cent of the total energy in sunlight, transmitting 92 per cent of the visible light, which constitutes 44 per cent of the sun's total energy (See Table 1). Hence the amount of energy entering the room by the re-radiation process is very small in comparison with the direct sunlight transmitted through the glass, and likewise there is very little heating of the glass.

"In the case of special heat-absorbing glass, the selective absorption effect is very much enhanced, with a total absorption of about 53 per cent of the total energy in sunlight, and a visible light transmission of 76 per cent.

"With this marked increase in absorption, the re-radiation effect becomes an important factor in transmitting energy into the room; so that while a very desirable heat screening effect is obtained with a single window of heat-absorbing glass, due to the fact that the glass dissipates heat outwards as well as inwards, much better results should be obtained through the use of double windows, with ordinary glass in the inner sash, special heat-absorbing glass in the outside sash, and means provided for removing the heat absorbed by the outer sash glass as rapidly as possible.

"Another consequence of the high percentage of energy absorption in the heat absorbing glass is that the glass becomes very hot when exposed to intense sunlight so that it may be subjected to very severe thermal stresses, as for example when shadows cover part of the window. Hence the thermal resistance of heat-absorbing glass must also be considered."

Tests were made in a house cooled by circulating water. Characteristics of the borosilicate heat-resisting, heat-absorbing glass and the ordinary window glass used in the tests were given in Table 1. The heat-absorbing glass was 3 mm. polished plate of a slightly bluish-green color, but so light in tint that it could scarcely be noticed by an observer standing inside the test house. The ordinary window glass was of double-strength drawn sheet.

Ventilation Slots Used

In the double windows, all the outside sashes were equipped with slots at the top and bottom which permitted reasonably free circulation of air between the windows.

"The estimated percentage saving for heat-absorbing 3 mm. plate was 23.3 per cent with the single windows and 37.7 per cent in the case of the double window combination," Mr. Shaver declared.

"The maximum values observed in the test were 24 per cent for the single windows and 28.5 per cent for the double combination, and in the latter case the value is somewhat reduced because the ventilating slots were closed for part of the time."

Before the refrigerating equipment was installed, a series of tests was made to determine the effect of heat-absorbing glass alone in reducing the maximum temperature attained in the test room.

"The differences in maximum temperature attained in the two houses ranged from 4 to 14° F. with an average of 7.3° F.," Mr. Shaver reported. "These differences of course depend on the duration and intensity of the sunshine, but nevertheless the results show a very appreciable difference in favor of the heat-absorbing glass which would be of real value, for example, in cases where systems of night air cooling were used."

Where Persons Sit in Sunlight

Effectiveness of heat-absorbing glass in increasing the comfort of an individual sitting in a window where he is exposed to direct sunlight was indicated by the results of temperature measurements taken during the period when the houses were cooled to 70° F., Mr. Shaver declared.

Maximum-minimum thermometers with blackened bulbs were suspended just inside the inner window so as to be exposed to direct sunlight.

Data from these tests showed that the use of heat-absorbing glass would make an appreciable difference to an individual sitting in a window exposed to the sunlight, temperature differences of as much as 16° F. being demonstrated.

"The question of the effect of heat-absorbing glass on fuel cost in winter time is one of general interest," Mr. Shaver stated. "If this glass is effective in screening out the sun's heat in the summer time when it is undesirable, it would appear that it should be equally effective in winter weather when the sun's heat is desirable.

"Tests showed that an increase of about 9 per cent in heat was required due to the heat-absorbing glass used in the windows."

In connection with the use of heat-absorbing glass there arises the question of the chemical durability of the glass, the permanency of the heat-absorbing effects, and the ability of the glass to withstand the service conditions that may be encountered, Mr. Shaver observed.

Chemical Durability

"As far as the chemical durability is concerned," he observed, "the borosilicate heat-resisting type of glass is believed to be quite equal and may even be superior to ordinary window glass. The heat-absorbing properties are obtained by means of the chemical composition and appear to be as permanent as the glass itself.

"With respect to service conditions, the heat-resisting type of heat-absorbing glass with a thermal expansion coefficient slightly greater than one-half that of the usual heat-absorbing glass possesses a thermal endurance almost twice as great, giving an increased safety factor and permitting much larger sizes of heat-absorbing plate to be used."

Table 1. Characteristics of Glass Used in Tests

Glass	Thickness	Visible Light Transmission	Total Solar Energy Transmission	Total Solar Energy Reflected
Borosilicate Heat-resisting Heat-absorbing Plate	3 mm	76%	42%	5%
Ordinary Window Double Strength	3 mm	92%	88%	8%

OFFER your customers HALSEY TAYLOR ELECTRIC WATER COOLERS . . . the same as the government uses and as you will find in prominent industrial plants and offices everywhere, with a long record of unfailing performance.

These coolers come in 10 distinctive models, in capacities from 3½ to 14 gallons, and with cabinets of smart olive-green baked crinkle finish!

They are mechanically efficient, economical, easy to install, require minimum servicing and in addition have the famous Halsey Taylor two-stream projector, which provides the ideal, health-safe drinking mound . . . *a feature found only in Halsey Taylor Coolers!*

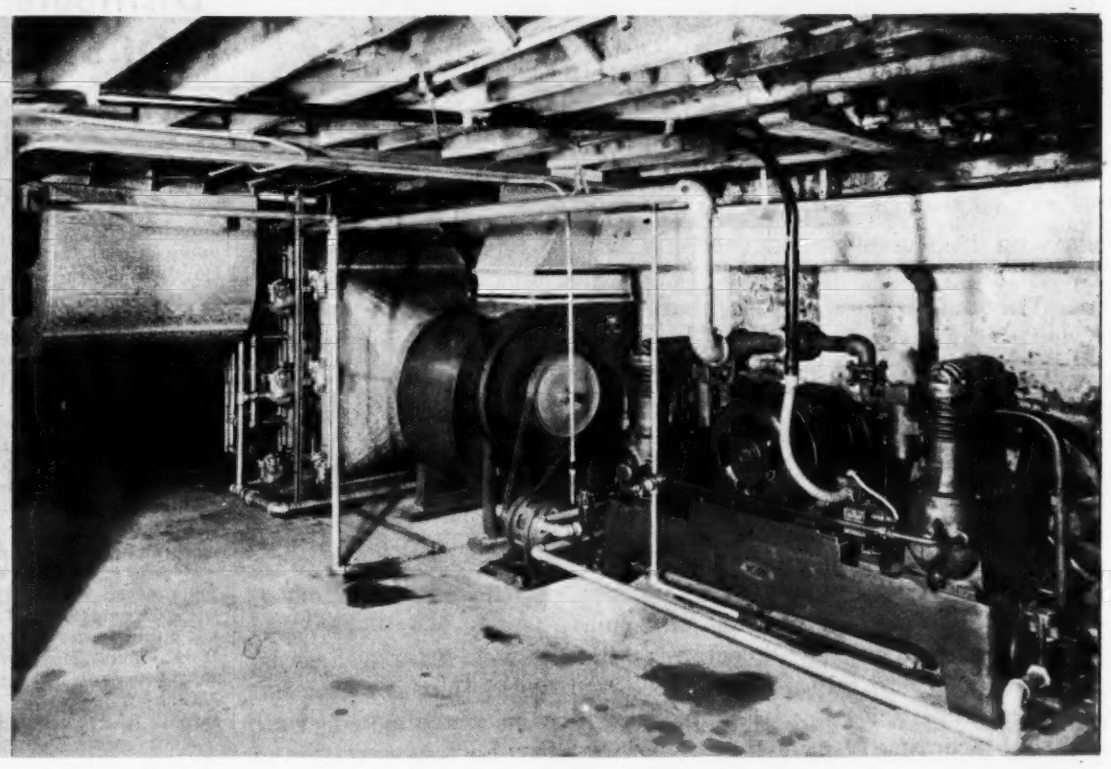
This extra feature gives you *extra sales advantages without extra cost!*

Write for our liberal dealer proposition; investigate what Halsey Taylor Coolers mean to you in sales, in profits, in customer good will. Limited territory still open—act quickly. Write or wire.

The Halsey W. Taylor Co., Warren, Ohio

Manufacturers of Nationally-Known Halsey Taylor Drinking Fountains

A Ladies' Apparel Store Gets Modernistic Trimmings and an Up-to-Date Air-Conditioning System



Air conditioning in the Miller-Wohl ladies' ready-to-wear store in Des Moines, Iowa, protects goods on display and makes patrons and employees comfortable. At the left is shown the modernistic shoe salon, showing grilled outlets on the wall. At the right is a view of the air-conditioning equipment in the basement, showing the new-type York duplex 20-hp. condensing unit, the 3-hp. blower fan, and part of the heating and cooling coils in the central conditioning chamber.

* * *

Westinghouse Tests Electric Air Filter

PITTSBURGH — Several experimental models of an electrical unit to remove dust, soot, pollen, or other solid and liquid particles in air have been installed in homes and offices by Westinghouse Electric & Mfg. Co.

Data are also being gathered by physicians who are using the units in treatment of patients afflicted with asthma or pollen fevers.

Electrically the unit is so arranged that it draws particle-filled air past two small wires, suspended horizontally. Connected to a power pack, which raises their voltage, these wires "charge" all air particles in their vicinity. This act is termed ionizing the air.

The ionized particles are drawn through a series of plates which are also charged. The plates have opposite polarity, with the result that these air particles move and cling to the plate, causing the air to clean itself.

In addition, a film of oil covers each plate to make certain that the particles will stick after being attracted. After the aluminum plates fill up they may be cleaned by running water over them.

The air, freed of particles, is sent on into the room by means of a fan.

In sections of Pittsburgh, 97 per cent of the impurities collected was in the form of soot. In outlying sections, the larger percentage of particles consisted of various irritating pollens.

Three Southern Theaters Order Conditioners

YORK, Pa.—York Ice Machinery Corp. recently received air-conditioning orders from three southern theaters, reports S. E. Lauer, general sales manager.

Orders received were from the Arcade Theater in Lake Charles, La., The State Theater in Miami, Fla., and the New Grandby Theater of Norfolk, Va.

WHEN ONLY THE BEST IS GOOD ENOUGH

Your household cabinets are judged by the country's most critical audience—the American housewife. M & E Compressors and equipment have demonstrated their ability to assure cabinet assemblers and manufacturers this essential and much sought approval.

Correspondence is invited

MERCHANT & EVANS CO.
MANUFACTURERS
PHILADELPHIA
EST. 1866 – *Plant:* LANCASTER, PA

Ready-to-Wear Store Installs 20-hp. York Duplex Unit

DES MOINES—As part of a program of modernization, Miller-Wohl ladies' ready-to-wear store here recently installed a year-'round air-conditioning system to eliminate dust, reduce cleaning expenses, aid in preservation of fabrics on display, and make patrons more comfortable. Installation was made by York Ice Machinery Corp.

The system has a York 20-hp. Freon condensing unit with two 3-cylinder compressors driven by a single motor, mounted between the compressors and connected by V-belts.

Below the compressors, in a cast iron base, is the coil-type condenser unit. The two compressor units have one common suction pressure control and operate as one machine. The mechanical elements of the system are located in the basement.

Three sections of York coils of the finned surface duplex steam heating and cooling type are located one above the other, and are made of seamless copper tubing, with flat aluminum fins pressed on. Coils are housed in a galvanized iron housing equipped with a drain for the condensate.

Control of the refrigerating process is by means of thermally operated expansion valves, which automatically regulate expansion of the Freon liquid refrigerant in the system.

The air is circulated by means of a low speed centrifugal fan, driven by a 3-hp., two-speed motor. The fan operates at a higher rate of speed in the summer than in the winter when a smaller quantity of air is required. All fresh air entering the system is cleansed by filters placed just ahead of the coils in the same housing with the coils.

The air distribution system consists of galvanized iron air ducts located in the space above the dress cases in the main store. The ducts extend around the oval-shaped end of the dress salon, and down the side walls to the front of the store. Air outlets are placed in the main air duct at various points, opening into the salons.

Grilles are located at the air supply outlets, and eliminate drafts or direct currents of air from the duct. All duct work and mechanical elements of the system are concealed.

The ducts supply conditioned air to each of the fitting rooms and offices of the establishment as well as to the alteration, storage, and stock rooms in the basement.

The air is returned through grilles in the top of the dress cases to the space above the cases, where it is conducted through a vertical duct back to the air-conditioning unit.

Ducts are equipped with dampers and splitters to regulate the volume of air passing to the various branches and outlets.

The system has adjustable thermostatic control of temperature and humidity. The thermostat is located in the main dress salon, and may be operated to control the condensing unit of the system.

The system is designed to maintain a summer temperature of approximately 80° F. with a relative humidity of 50 per cent when the outside temperature is 95° dry bulb, with a 77° wet bulb temperature. During winter operation, room temperatures of 70° F. or higher are secured.

Goodman Becomes Trane Engineer

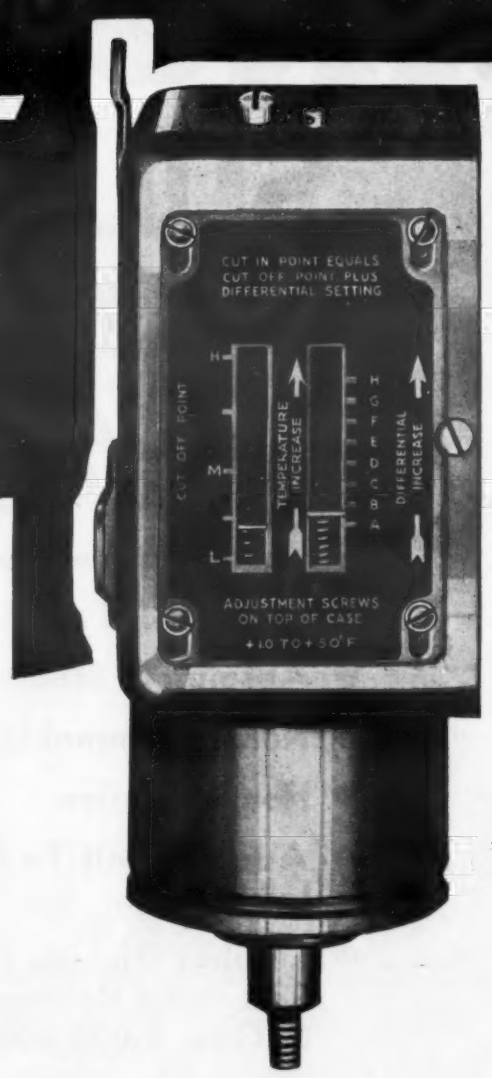
LA CROSSE, Wis.—William Goodman, former consulting engineer of Chicago, has joined the engineering staff of the Trane Co., air-conditioning manufacturers.

Mr. Goodman has designed air-conditioning equipment for many of the large buildings in Chicago. He was formerly associated with the Paramount Theaters Corp. in connection with air-conditioning work and more recently with Warner Bros. Theaters Corp. in charge of design, maintenance, and operation of air conditioning, heating, and ventilating equipment in their numerous theaters throughout the United States.

In joining the Trane Co. staff, Mr. Goodman will take up his activities immediately. He is planning to write several text books on air conditioning for industry and commerce, which will be published under the Trane name.

The Visible Scale REFRIGERATION CONTROL

Accurate adjustment, quick and simple installation . . . . . less servicing


CUT IN POINT EQUALS CUT OFF POINT PLUS DIFFERENTIAL SETTING
CUT OFF POINT
TEMPERATURE INCREASE
DIFFERENTIAL INCREASE
ADJUSTMENT SCREWS ON TOP OF CASE
+10 TO +30°F

VISIBLE SCALES are standard equipment on Minneapolis-Honeywell Refrigeration Controls. They eliminate the hit or miss method of adjustment, as with ordinary controls, and save untold time in service and installation . . . Locking devices and mercury switches are other features which make the Minneapolis-Honeywell line superior, yet these controls cost no more. For performance, economy and durability, specify Minneapolis-Honeywell Refrigeration Controls. Minneapolis-Honeywell Regulator Co., 2807 Fourth Ave. South, Minneapolis, Minn. Branch and distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL
CONTROL SYSTEMS

Sales Idea of the Week

By V. E. Vining, Manager of Department Store Sales, Westinghouse Electric & Mfg. Co.

Most of us are salesmen because we're too lazy to be bricklayers.

To be a bricklayer we must first be an apprentice.

To be a journeyman we must first be a helper.

A lawyer goes to school for years for the privilege of starving in the office next to his doctor friend who does the same thing.

The minister and the plumber, the bill poster and the banker, sweat years to earn their place—and most discouraging of all, each of them had to learn some one thing thoroughly.

Salesmen—How do we get to be a salesman? I'll tell you.

Wait until they bring out a new city directory and after you have given the reporter your name and address he will ask you your business or profession. Then stick out your chest, press the tonsils forward, and say—clearly, distinctly—

"Salesman."

There will be your diploma, printed in the city directory—that all the world may read—and run.

There, in the city directory, will, in ever after years, be your authority to tell a sleepy, cockeyed world that *you can sell anything*—not a service—not an appliance or anything so crude as that—because *you sell personality*—in short *yourself*, and that's that.

If you think I exaggerate—go to the public library tonight. See how many salesmen you find.

You'll never hold an impromptu sales meeting in a public library.

Losing Salesmen Eat Rattle Snake

FORT SMITH, Ark.—In an unusual sales contest held recently by the Electric Appliance Co., Crosley dealer in this city, the losing team was served a dinner in which the main course was diamond-back rattle snake. The winners were served chicken.

To advertise this contest merchandise was attractively arranged in the showroom, and a stuffed diamond-back rattle snake was placed in the display window with a show card explaining the contest. The salesmen wore badges on which was printed, "Rattle Snake Contest."

The sales force was divided into two groups. Mr. J. F. McGehee of the company says of the contest:

"The men worked hard and made this 30 days (from March 15 to April 15) one of the best we have had in the history of the business. The contest was neck and neck. It was so close that the decision depended upon the sale of a $12 used radio at the last moment.

"During the month of the contest we sold $1,000 worth of radios. The losing team was so chagrined that it asked for a comeback, which the other side granted. This second contest started April 20 and ended May 20, and resulted in another good month for the company."

The Electric Appliance Co. is already on its fourth carload of Crosley refrigerators, and Mr. McGehee believes that they will sell six carloads.

Mr. McGehee states that his sales forces are divided into four groups, each under a captain. These captains are paid an extra commission for closing sales and assisting the men under them. They are allowed to sell and receive a commission of what they produce individually.

Keeton Named Manager of Olympia Dealership

OLYMPIA, Wash.—C. W. Keeton has been named manager of the General Utilities Co. here. The company handles Frigidaire electric refrigerators, Philco radios, Easy washers, and other electric appliances.

ANSUL

SULPHUR DIOXIDE

A Safe Refrigerant

- Perfect For Leak Detection
- Absolutely Stable
- Non-Inflammable
- Non-Explosive
- Adapts Itself To Perfect Lubrication
- Sulphur Dioxide Is The Successful Refrigerant In Over 6,000,000 Units

ANSUL CHEMICAL COMPANY
MARINETTE » » » » » WISCONSIN

Matthews Leads All Distributors at End Of Sweepstakes

CLEVELAND — Matthews Electric Supply Co., Birmingham, Ala., led all distributors with 242 per cent of sales quota to finish first in group 1 of the Refrigerania Sweepstakes, nation-wide nine weeks' spring sales campaign sponsored by the specialty appliance department of the General Electric Co., ended June 1.

Distributors' competition in the Refrigerania Sweepstakes was established by dividing the 56 distributorships in the country into 11 geographical groups. Winners in these groups were as follows:

Group 1, Matthews Electric Supply Co., Birmingham, Ala.; group 2, L. W. Driscoll, Inc., Charlotte, N. C.; group 3, Electric Household Appliances, Inc., Dallas; group 4, G-E Supply Corp., Portland, Ore.; group 5, Electric Appliances, Inc., Indianapolis.

Group 6, A. Wayne Merriam, Inc., Schenectady; group 7, E. Pulver Cook, Inc., Providence, R. I.; group 8, W. L. Thompson, Inc., Boston; group 9, R. Cooper Jr., Inc., Chicago; group 10, Crescent Electric Supply Co., Davenport, Iowa; group 11, G-E Supply Corp., Salt Lake City.

Distributor principals in each of the 11 groups were awarded an original painting of a thoroughbred Kentucky Derby winner.

Merchandise Prizes Awarded

Merchandise prizes were awarded to salesmen, dealers, central station merchandise executives, sales managers, and distributor heads throughout the country whose sales performances were outstanding.

Among retail sales managers, J. B. K. de Loach of Perry Browne, Inc., led the nation with 291 per cent of quota. Kenneth Hampton, Valley Electric Supply Co., Fresno, Calif., made 252 per cent; J. B. Noyes of W. N. Hogan, Wheeling, W. Va., made 189 per cent; and C. C. Conrad, Electrical Housekeeping, Inc., Cleveland, made 162 per cent.

W. I. Nicholas, National Electric Supply Co., Washington, D. C., led all sales managers of commercial refrigeration equipment with 160 per cent of quota. Gordon Smith, distributor principal and wholesale sales manager of Matthews Electric Supply Co., led in this classification with 177 per cent. Outstandnig apartment house sales manager was Aaron Kosser, Cleveland, who made 222 per cent.

Exceeds Year's Quota

G. B. Richardson, merchandise manager of the Texas Power & Light Co. of Texas and Louisiana, whose nine weeks' sales exceeded his entire year's quota, won the central station merchandise managers' race.

On "Derby Day," the last day of the contest, several sales organizations worked all day and all night, returning to the sales rooms at sun-up for breakfast and to report results.

Don Keller, Midwest Electric Appliances, Inc., Kansas City distributor sent his men out that last night with instructions to canvass wherever a light showed. The jockeys called on all-night restaurants, filling stations garages, and police and fire stations. Three policemen were sold while pacing their beats.

At Cleveland, salesmen of Electrical Housekeeping, Inc., obtained signed orders for 11 refrigerators from policemen on night duty at precinct stations.

A Month's Sales in 24 Hours

H. A. Pendergraph, Tennessee Appliances, Inc., Nashville, utilized Derby Day as a feature in the campaign and realized a month's business during the 24 hours of that day.

Matthews Electric Supply Co. and George Patterson, Inc., St. Petersburg, Fla., realized more than 200 per cent of quota.

Six central stations in the southeastern part of the country during one week of the campaign, purchased 23 carloads of a 46 car trainload of refrigerators. The train was dedicated to A. M. Sweeney, general sales manager of G-E's specialty appliance department and was called the "Sweeney Southeastern Special."

On June 12, a Victory banquet was attended by all key men in the specialty appliance department. Jean de Jen, campaign manager, was host, A. M. Sweeney, general sales manager, was toastmaster, and P. B. Zimmerman, manager of the specialty appliance department, was the principal speaker.

Fairfield Made Advertising Manager of Insulite

MINNEAPOLIS—M. C. Fairfield succeeds H. H. Strobusch, resigned, as advertising manager of The Insulite Co. of this city. Mr. Fairfield was for five years advertising manager for Flax-li-num Insulating Co., now liquidated, and spent 10 years in direct-mail work.

Frozen Desserts Recipes Are Featured in First Borden News Reel

NEW YORK CITY—First issue of the *Borden News Reel*, edited by Helen Kimball, was recently published by the Borden Kitchen here. The leaflet is designed for use of the home economist, whether demonstrator, food editor, consultant, or teacher.

The five-page pamphlet includes six recipes with side comments, deals briefly with irradiated milks, and contains a coupon to be sent in for sample Borden products and leaflets for automatic refrigerator recipes, "extra good recipes," cheese recipes, and mince meat recipes.

The "News-Reel" includes the following refrigerator recipes:

Fresh Strawberry Ice Cream

⅔ cup Eagle Brand sweetened condensed milk
½ cup water
1 cup strawberries
¼ cup confectioners' sugar
1 cup whipping cream

Blend condensed milk and water thoroughly. Add strawberries which have been crushed and sweetened with sugar. (The average strawberries require about ¼ cup sugar). Chill. Whip cream to custard-like consistency, and fold into chilled mixture. Pour into freezing pan. Place in freezing unit. After mixture is about half-frozen remove from refrigerator. Scrape mixture from sides and bottom of pan. Beat until smooth, but not until melted. Smooth out and replace in freezing unit until frozen for serving. Serves 6.

Berry Sherbet

⅔ cup Eagle Brand sweetened condensed milk
2 tablespoons lemon juice
2 tablespoons melted butter
½ cup water
1 cup crushed fresh strawberries or raspberries

Blend condensed milk, lemon juice, melted butter, and water. Add berries. Chill. Beat egg whites until stiff and fold into chilled mixture. Pour into freezing pan. Place in freezing unit. After mixture is about half frozen, remove from refrigerator. Scrape mixture from sides and bottom of pan. Beat until smooth, but not until melted. Smooth out and replace in freezing unit until frozen for serving. Serves 6.

The leaflet for automatic refrigerator recipes mentioned in the coupon of the news reel contains recipes for various kinds of ice cream, milk sherbets, refrigerator cakes and pies.

An example of pies that are "baked" in the refrigerator is as follows:

Lemon Cream Pie

1⅓ cups (1 can) Eagle Brand sweetened condensed milk
½ cup lemon juice
Grated rind of 1 lemon or ¼ teaspoon lemon extract
½ cup whipping cream
2 tablespoons confectioners' sugar
Vanilla wafer or graham cracker pie crust.

Blend together condensed milk, lemon juice, and grated lemon rind. Pour into an 8-in. pie plate lined with vanilla wafer or graham cracker pie crust. Cover with whipped cream sweetened with confectioners' sugar. Chill before serving.

Glass Company Films Depict Advantages of Store Modernization

CHICAGO—Four films, stressing the opportunities for merchants and store owners to profit through store front improvement and better lighting, were shown to about 50 representatives of business papers at a special preview last week in the Palmer House.

The films are being sponsored by Pittsburgh Plate Glass Co. and the lamp and lighting divisions of Westinghouse Electric & Mfg. Co., in connection with the Federal Housing Program.

Prior to the showing, E. L. Patton, divisional advertising manager of the Pittsburgh Plate Glass Co, J. F. O'Brien of the Westinghouse Electric & Mfg. Co., and Percy Wilson, regional director of the FHA, spoke on the improvement campaign and what it means, in the way of profits, to merchants, store owners, and public utilities.

This country is rapidly approaching a national housing shortage, Mr. Wilson warned. In normal years, he said, approximately $6,000,000,000 worth of home construction is done, of which about $1,500,000,000 is for new homes.

Rentals, in all large cities, have increased greatly in recent months, indicating that a real market for new homes does exist, Mr. Wilson stated. He said that national demand for new homes at the present time was in excess of 4,000,000.

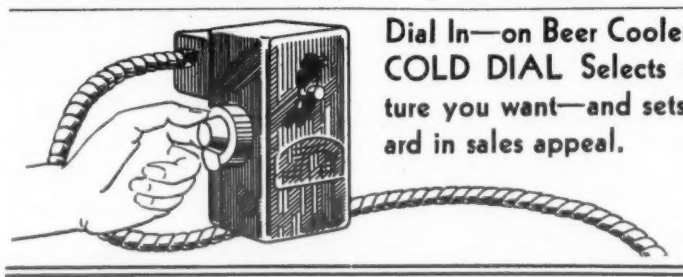
There will be no return to normal prosperity, Mr. Wilson said, until the durable goods industries again start coming back. Home building industries, he said, have been noticeably backward about contributing to the general scheme of recovery thus far.

The four films, which Pittsburgh Plate Glass and Westinghouse are preparing for nation-wide distribution to merchants and utility companies through district branch offices, are designed to present a clear picture of what can be expected from modernization.

Each film requires about 10 minutes to show, and the combined showing presents a convincing outline of the differences in appearance, rental value, store traffic, and profits before and after modernization was attempted.

To further stimulate interest in both store front and lighting modernization, four new direct mail folders have been produced. These folders are in the form of four-page letters, with provision for a letter from the dealer on the outside, and a printed sales story on the inside.

Besides the actual selling material, both organizations offer a variety of free services to merchants planning improvements in their places of business. Pittsburgh Plate Glass Co. offers a planning and designing service, on Pittco store fronts, available to merchants who wish individualized fronts. These designers will work directly with the merchant prospect, or assist in an advisory capacity, if an architect is employed.

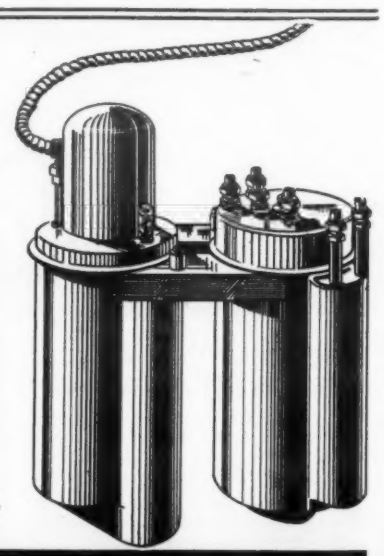


Dial In—on Beer Cooler Profits. This COLD DIAL Selects the Temperature you want—and sets a new standard in sales appeal.

WRITE NOW RIGHT NOW!

- - - for the FACTS about this sensational new Beer Cooler -

Wherever COLTROL is installed, its exclusive features are creating a sensational demand for more of them. The COLD DIAL that the *customer* sets to get the temperature he wants, is only one of COLTROL'S features. Cooling of 5 kinds of liquids at one time, is another. Optional use of Sulphur Dioxide, Methyl Chloride or Freon, is another. Freedom of costly servicing, is another. And there are many more. Get the facts now and get your share of the quick sure profits that COLTROL brings to distributors. Write us today—there's no obligation.



COMMERCIAL COIL & REFRIGERATION CO.
455 N. ARTESIAN AVE. — CHICAGO

COLTROL
the LIQUID COOLER *with the* COLD DIAL

PATENTS

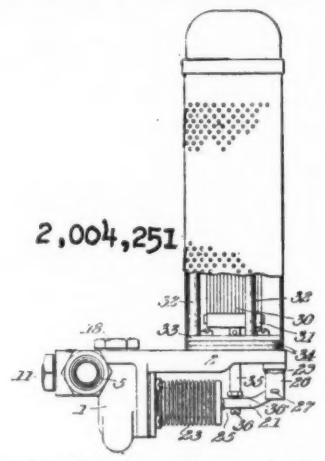
Issued June 11, 1935

2,004,147. HUMIDIFYING SYSTEM. Robert H. Worrall, Washington, D. C. Application Sept. 8, 1933. Serial No. 688,609. 4 Claims. (Cl. 261—103.) (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.)

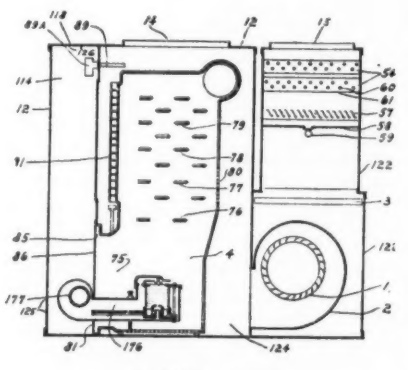
1. In combination with a heating unit, a humidifying device, said device comprising a source of moisture, means conducting moisture from said source above the heating unit, and means forming said moisture into a film and exposing said film to the air over said heating medium and below said moisture source, said conducting means comprising a perforated tube, a sleeve wick snugly encircling said perforated tube, said film forming means comprising a second wick tautly contacting with and depending from said sleeve wick.

2,004,251. HUMIDITY CONTROLLED VALVE. Jerry H. Simpson, Winston-Salem, N. C., assignor to The Bahnson Co., Winston-Salem, N. C., a corporation of North Carolina. Application Aug. 30, 1932. Serial No. 631,089. 10 Claims. (Cl. 236—44.)

1. In a humidity control valve, a valve casing having a flexible wall portion, a valve therein, a bracket extending later-



ally of said valve casing, a hygrostatic control element mounted on said bracket, and a lever connected to said control element and pivotally supported from said bracket, said lever extending through said flexible wall portion to actuate said valve.



2,004,255. AIR CONDITIONING UNIT. Reuben N. Trane, La Crosse, Wis. Application May 15, 1933. Serial No. 671,034. 8 Claims. (Cl. 257—9.)

1. In an air conditioning unit, the combination of a casing having an air inlet and outlet, a blower producing a flow of air through said casing, a heat exchanger, within said casing in the path of said air, a source of heat within said exchanger, a humidifier mounted on said exchanger, an air filter and a cooling coil comprising tubes with fins mounted thereon within said casing in the path of said air, a source of cold connected to said coil and means below said fins to catch the water condensation on said fins, and means to control the supply of heat to said exchanger and of cold to said cooling coil.

2,004,387. MANUFACTURE OF FINNED TUBING. Edward A. Dewald, Massillon, Ohio, assignor to The Griscom-Russell Co., New York, N. Y., a corporation of Delaware. Application Aug. 7, 1931. Serial No. 555,718. 4 Claims. (Cl. 29—157.3.)

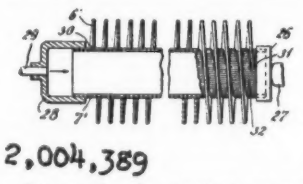
4. The method of forming a finned tube which comprises displacing a portion of the metal at the outer surface of a metal tube to form a groove having raised edges, inserting a metal ribbon edgewise into said groove and crimping the edges of the groove to cause the same to grip the metal ribbon.

2,004,388. MANUFACTURE OF FINNED TUBING. Edward A. Dewald, Massillon, Ohio, assignor to The Griscom-Russell Co., New York, N. Y., a corporation of Delaware. Application June 25, 1932. Serial No. 619,215. 13 Claims. (Cl. 29—33.)

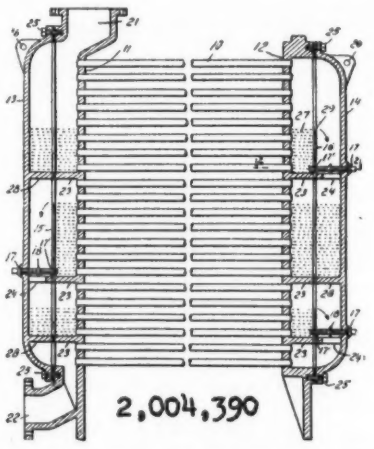
1. A machine of the type described, comprising means for supporting a metal tube, a blunt scoring tool, means for rotating the tube with respect to the scoring tool, whereby a groove is formed in the tube, means for feeding a metal fin into the groove, and means for crimping the groove edges to cause the same to grip the fin.

2,004,389. MANUFACTURE OF FINNED TUBING. Russell C. Jones, Bronxville, N. Y., assignor to The Griscom-Russell Co., New York, N. Y., a corporation of Delaware. Application May 22, 1933. Serial No. 672,146. 8 Claims. (Cl. 29—157.3.)

1. The method of securing a helical fin on a metallic tube which comprises placing a helically coiled fin about the tube



surface, fixing the fin against circumferential movement about the tube due to expansion of the tube and expanding the tube into gripping contact with the fin.



2,004,390. HEAT EXCHANGER. Julius Benzinger, Queens Village, N. Y., assignor to The Griscom-Russell Co., New York, N. Y., a corporation of Delaware. Application April 11, 1934. Serial No. 720,017. 16 Claims. (Cl. 257—32.)

1. Apparatus of the type described, comprising a pair of headers, a plurality of tubes interconnecting said headers and providing cooling surface, means for supplying condensible vapor to said tubes, and means for controlling the flow of condensate through said tubes to subject the same to varying areas of cooling surface as it progresses, to maintain the temperature of the condensate substantially as low as that of the vapor in contact therewith.

2,004,440. PACKING ARRANGEMENT FOR ELECTRICAL MACHINES. August Kazenmaier, Friedrich Allendorff, and Anton Schmid, Stuttgart, Germany, assignors to Robert Bosch, Aktiengesellschaft, Stuttgart, Germany. Application Oct. 28, 1932. Serial No. 640,114. In Germany Nov. 10, 1931. 5 Claims. (Cl. 286—5.)

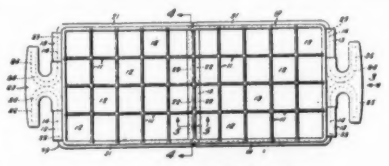
1. A packing arrangement for preventing the penetration of liquid-oil lubricant and vapors of said lubricant from a gear box into the casing of a machine of the type having a rotor shaft extending from the machine into the gear box for driving the machine comprising an end cover structure for said machine having a wall portion disposed in said cover structure inwardly with respect to said machine, rotatably journalling said shaft and forming an end boundary wall of said machine, a flange adapting said cover structure to be attached to the wall of the gear box about the shaft, and an outer wall portion extending radially inward from said flange toward said shaft in such spaced relation with said first-mentioned wall portion as to form therewith a chamber in said cover structure about said shaft, said outer wall portion having a neck-like extension directed outwardly of said chamber in surrounding relation to said shaft and provided with an annular groove in its outer peripheral face, a rotatable splash ring on said shaft in proximity to said annular groove, means packing said chamber and said end boundary wall against said shaft, and conduit means formed in said cover structure opening said chamber to atmosphere at a point exterior to said gear box and said machine.

2,004,446. COMBINED WHIPPER AND SCRAPER FOR ICE CREAM FREEZERS. Herbert S. Mills, River Forest, Ill., assignor to Mills Novelty Co., Chicago, Ill., a corporation of Illinois. Application Aug. 28, 1933. Serial No. 687,097. 8 Claims. (Cl. 259—9.)

1. In a freezer, a combined whipper and scraper comprising a rotatable unit including an angle member positioned adjacent the freezer cylinder when the unit is inserted therein, said member having a blade adapted to contact with the cylinder wall to scrape the latter when the unit is rotated and a whipper element rigid with said scraper blade extending inwardly from said wall to whip the cream during such rotation.

2,004,525. FREEZING TRAY. Harvey D. Geyer and Frederick W. Sampson, Dayton, Ohio, assignors, by mesne assignments, to General Motors Corp., Detroit, Mich., a corporation of Delaware. Application Nov. 25, 1931. Serial No. 577,250. 6 Claims. (Cl. 62—108.5.)

6. In combination, a molded flexible rubber freezing tray and a metal support therefor attached thereto at its two upper



end portions and its lower central portion, said combined rubber tray and metal support being capable of a substantial endwise bending movement, whereby to facilitate the upward flexing of the central portion of said tray.

2,004,691. FLORIST'S REFRIGERATOR. George E. Friedrich, San Antonio, Tex., assignor to Edward Friedrich, San Antonio, Tex. Application Dec. 4, 1934. Serial No. 755,953. 4 Claims. (Cl. 62—102.)

1. In refrigerators, a cabinet having a bottom, a top, a back wall and a front wall, doors in the front wall, said cabinet enclosing a display chamber, a perforated ceiling spaced from the top of the cabinet within said display chamber and providing a top air space, a down-air duct located across the back of the cabinet within the display chamber, said down-air duct communicating along its top with the space above the ceiling, a horizontal air collecting duct located within the cabinet at the juncture of the bottom and the back wall and communicating along its length with the bottom of said down-air duct to receive the air therefrom, a blower duct within the cabinet at the junction of the bottom and one end wall, one side of said blower duct communicating with said air-collecting duct, a blower in said blower duct, said cabinet having a cooling compartment at the bottom extending from said blower duct to the opposite side of the cabinet and located between the front wall of the cabinet and said air collecting duct, pans constituting a cover for said cooling compartment and having air passages, a duct extending along the bottom of the cabinet from said blower duct to the opposite side of the cabinet and being in communication with said blower duct and having its top wall perforated, cooling means mounted in said cooling compartment above said perforated duct, a foraminous floor laid over said pans, and flower supporting shelves located adjacent the down-air duct.

2,004,692. REFRIGERATOR. George E. Friedrich, San Antonio, Tex., assignor to Edward Friedrich, San Antonio, Tex. Application Dec. 4, 1934. Serial No. 755,954. 7 Claims. (Cl. 62—102.)

1. In a refrigerator, a cabinet having a food compartment which extends substantially the full length and depth and height of the cabinet, a floor for said compartment having air passages, an air collecting duct and a cooling chamber extending lengthwise of the cabinet beneath the floor, cooling means in said cooling chamber, a blower chamber at one end of said cabinet with which one end of said air collecting duct communicates, a down-air duct located at each end of the cabinet, said air collecting duct communicating at one end with one of said down-air ducts and communicating at the other end with said blower chamber, a blower in said blower chamber, an air delivery duct extending from said blower beneath said cooling chamber and terminating adjacent the opposite end of the cabinet and having a foraminous top to deliver air into said cooling chamber, an approximately horizontal combined food shelf and return air duct extending lengthwise in said compartment, spaced below the top thereof and communicating at its ends with said down-air ducts respectively.

INSTALLATION OPERATIONS

A SERIES OF LESSONS OUTLINED FOR THE USE OF THE SERVICE MANAGER IN INSTRUCTING BEGINNERS IN INSTALLATION WORK

No. 11—Installing Evaporator in Galvanized Lined Ice Box

By K. M. Newcum

TOOLS NEEDED:

One steel rule, one small adjustable wrench, one ¼-inch center punch, one hammer, one level.

MATERIALS NEEDED:

Four ⅜x3½ inch galvanized lag screws.
Four ½-inch galvanized washers.

PROCEDURE:

1. Measure ice compartment and ice door opening to make sure that the evaporator will fit into space provided.
2. Measure distances from each bolt hole in the hanger bracket assembly.
3. Measure and mark the ceiling of the ice compartment, where the lag screws are to be installed. Always allow at least 1 inch space between the back of the evaporator and the back wall of ice compartment. Allow at least the same amount of space on either side of the evaporator, for air circulation. For the sake of appearance and convenience, the evaporator should be installed in the center of the ice compartment, thus make all measurements and marks from the center.
4. Punch holes through the metal and about ¾ inch into the wood in the top of the ice compartment, where the marks have been made to admit the lag screws.
5. Insert lag screws through bolt holes in hanger assembly, placing washer under the head of each screw. Tighten the lag screws into the wood with the small adjustable wrench, until the evaporator and hanger assembly is rigid and secure.
6. Place level on evaporator, to make sure it is both level and plumb. If it is not level and plumb, adjust the lag screws by either tightening or loosening one or the other until the evaporator is level and plumb. If in adjusting the lag screws either of them are loose, remove them and add a sufficient number of galvanized washers between the top of the hanger and the top of the ice compartment to compensate for the difference. The coil should be rigid, as well as level and plumb.
7. Check with instructor.

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SERVICE

Servicing of Low Side Float Valves & Evaporators

Editor's Note: Mr. Newcum's articles constitute a manual of information on present-day refrigeration systems which will add to the service man's knowledge of refrigeration, and which will assist him in meeting specific problems in servicing operations in the field.

Discussed in the instalment in this issue are the operation and servicing of various types and makes of low side float valves and evaporator assemblies.

The first article in the series, which was published in the April 10 issue of the NEWS, dealt with the fundamentals of refrigeration. Inasmuch as refrigeration is really a process of the removal of *heat* from a given space, these "fundamentals" consist mainly of the terms, definitions, and physical laws which are involved when heat is transferred from one substance or space to another location.

In the second article, appearing April 17, the three principal parts of the refrigeration system — cabinet, evaporator, and condensing unit—were described briefly and the operating cycle of a refrigerator was explained in detail. Also published with this article was the refrigerant pressure-temperature chart and an explanation of service gauges.

Properties which are necessary for a good refrigerant were explained in the third article which appeared in the April 24 issue of the NEWS. The article also gave a detailed comparison of the physical properties and characteristics of the following refrigerants: sulphur dioxide, methyl chloride, ethyl chloride, ammonia, and Freon.

The instalments published in the May 1 and May 8 issues dealt with reciprocating compressors and their component parts. The May 1 article described the compressor body assembly, housing assembly, crankshaft and connecting rod assembly, eccentric shaft and connecting rod assembly, piston and piston valve assembly, and discharge valve assemblies.

Service operations on these various compressor parts are outlined.

The May 8 article dealt with different designs of stuffing box seals, operating principles of these seals, methods of servicing seals, compressor flywheels, direct-connected units.

Rotary compressor design and operation were described in the May 29 issue. Norge and Majestic makes of rotary compressors were described in some detail. Parts in the rotary compressor assembly were explained, and methods of servicing suggested.

Discussed in the June 5 article were the care and servicing of compressor and shut-off valves, gaskets, and the construction, use, and servicing of condensing unit shut-off valves.

The June 12 instalment dealt with condensers for compression-type refrigerating systems, and outlines details in the construction and operation of this part of refrigeration systems. Various types of condenser design were described and illustrated, and suggestions were made for their care and servicing.

Liquid receivers used with air-cooled condensers were described in the June 19 instalment. The article discusses in detail horizontal and vertical receivers for flooded and dry systems.

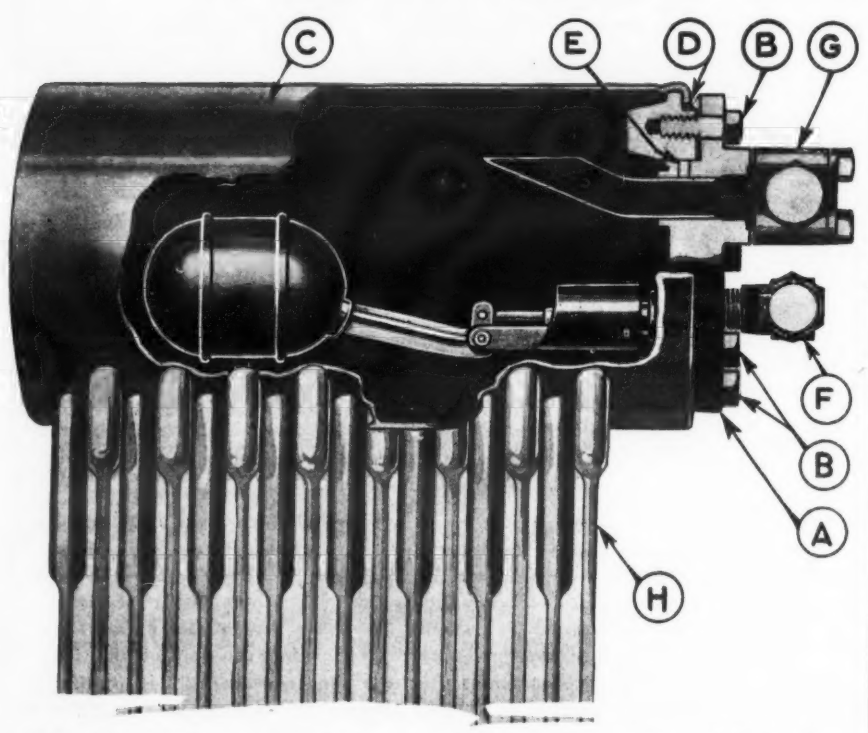


Fig. 84. Cooling coil cutaway to show various parts. "A" is the float valve assembly clamped in the boiler "C" by the use of cap screws "B." A tight seal is formed by a lead gasket at "E." The tubes at "H" contain refrigerant as well as the boiler proper. The boiler is silver soldered to the header at "D."

64. Lowside Float Valves and Evaporators

The low side float valve is and has been very extensively used as a liquid control or throttle valve on certain makes and models of domestic and commercial systems.

The principle of the float valve is familiar. Where this type of valve is employed, the evaporator is constructed with a header which houses the float valve mechanism Fig. 84, and the evaporator is labeled a flooded evaporator as the tubes and header up to a predetermined point are flooded with liquid refrigerant.

The float is suspended in this liquid, remaining closed while the evaporator has a sufficient amount of liquid. The float lowers and opens to admit more liquid into the evaporator as evaporation takes place. When the liquid has reached its predetermined level the float rises and closes, restricting or stopping the inflow of liquid until, by evaporation, more liquid is needed.

The principle of the low side float may be briefly defined as a valve that is located in the low side of the system to let the high pressure liquid in from the high pressure side of the system as required, its action being controlled by the liquid level in the evaporator.

The float valve is calibrated to maintain a certain definite liquid level. With sulphur dioxide there is in addition to the liquid refrigerant, a layer or blanket of oil. A return tube is provided to take the expanded gas or vapor from near the top of the header to the compressor. When used with SO_2, an oil return opening is also provided, usually on a slightly lower level than the gas return opening.

This is not considered necessary in a system using methyl chloride as there is no complete distillation of the oil and refrigerant in the evaporator, hence no definite oil blanket or level.

A shortage of refrigerant in a low side float valve system will return in a lower liquid level in the evaporator. The lower liquid level will cause the float to remain down, and the valve will be in the open position. The high pressure liquid or gas will continue to rush into the low pressure side or evaporator as the seal between these two pressure sides is broken due to the shortage.

A hissing or rushing noise will accompany a shortage of refrigerant and the evaporator will lose its frost for as the high pressure is partially united with the low pressure, a sufficiently low pressure to result in satisfactorily low refrigerant temperature is not accomplished. The system may operate continuously in an effort to reduce the pressure and temperature in the evaporator.

A leaking float valve will also be accompanied by a hissing noise and a broken seal between the two pressure sides of the system.

To determine which of these two conditions is existing the following rules may be followed: if the evaporator is frosted and the suction line is frosted or sweated, the system is not short of refrigerant so the condition may be laid to a leaky float valve. If the evaporator is not frosting, the liquid and suction line is warm, and the back pressure remains high with a hissing noise at the float, the system may be short of refrigerant.

Additional refrigerant added to the system should cause the evaporator to fill up, closing the float and the operation should return to normal.

A combination of these two conditions, that is a leaky float and a shortage of refrigerant may be determined by adding refrigerant to the system to the point where the evaporator will frost. If the low side pressure remains high and the suction line becomes sweated or frosted, the float valve may be said to be leaking.

Very often a small particle of dirt, carbon, or scale will lodge between the float valve needle and the seat, holding the valve open, resulting in high back pressure and a hissing noise at the valve.

It is suggested that when a leaky float is encountered, the liquid line shut-off service valve at the receiver be closed and the system operated from 10 to 30 minutes, depending on the size of the system and the refrigerant charge.

By closing the inflow of liquid, the level in the evaporator will be lowered and the float needle will move away from the seat.

The liquid line shut-off service valve should then be opened as widely as possible and the sudden rush of liquid past the needle and seat will usually dislodge the foreign material, and the float may seat properly. It is sometimes necessary to flush the float in this manner two or three times to remove the particle. If flushing doesn't cause the float to seat properly, it should be replaced.

The liquid receiver on the condensing unit of a system employing the flooded evaporator and the low side float is usually larger by comparison than the receiver on the dry expansion system. This is because, in addition to the charge of liquid in the receiver, the receiver should be sufficiently large, that is have a sufficient pump down capacity, to allow the full evaporator charge of liquid refrigerant to be pumped back into the receiver, in event it becomes necessary to remove the float valve for replacing.

Some condensing units do not have a full pump down capacity, and it is highly recommended that both the compound and pressure gauges be used when pumping any system down.

Excessive pressure due to the undersize receiver will respond on the pressure gauge. Where this condition

(*Continued on Page 17, Column 1*)

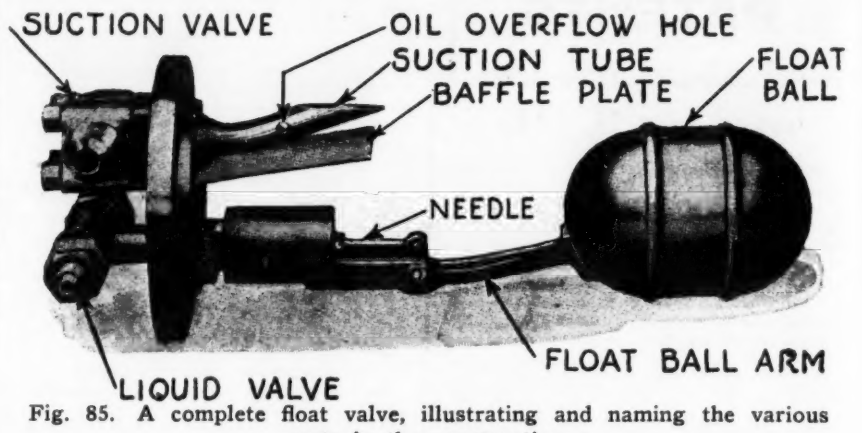


Fig. 85. A complete float valve, illustrating and naming the various parts in the construction.

SERVICE OPERATIONS

A SERIES OF LESSONS OUTLINED FOR THE USE OF THE SERVICE MANAGER IN INSTRUCTING BEGINNERS IN SERVICE WORK

No. 11—Purging Air from the Condenser (Any SO-2 Job)

By K. M. Newcum

REASON:

Air is very harmful to the inside of the refrigeration system as its presence will take a part of the condensing space and high operating head pressures will result. Air always contains a certain amount of moisture and moisture united with SO_2 will form sulphurous acid, which will attack iron and steel. Thus we must always be careful to rid the system of air.

PROCEDURE:

A. Allow the compressor to remain inoperative (shut off) for at least 15 minutes, until the condenser cools down to normal room temperature.

B. Attach the combination gauge set to both high and low sides of the compressor and put into operation.

C. Connect ¼-inch discharge line to service fitting on gauge set, and run to pail of lye water. Note—1 lb. of lye should be used to each gallon of water. 1.28 lbs. of lye will be used to absorb or neutralize 1 lb. of SO_2.

D. Be sure the discharge or purging line is near the bottom of the lye water.

E. Crack the valve on the combination gauge set, to which the high pressure gauge is attached allowing the air and SO_2 fumes, or gas to pass through into the lye water. The amount passing will be indicated by the bubbles in the water.

F. Always purge slowly, watching the gauge reading. Continue purging until the pressure has been reduced to a satisfactory pressure, as is indicated on the pressure temperature chart.

G. When pressure is reduced and you are through purging, close the valve on the combination gauge set, and *immediately* remove the purging line from the lye water, and disconnect the line from the gauge set.

H. Put the machine into operation, and allow it to run for at least 15 minutes, watching the gauge reading. If the pressure persists in rising above a normal pressure, stop the machine, and repeat the above operation.

I. Check with the instructor.

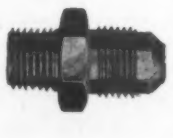
Note: It has been learned that because installation and service men do not possess the proper facilities for purging or discharging compressors in the users' homes, occasional damage to either the refrigerating or the users' equipment, such as rugs, furniture, etc., has resulted. This has been chiefly caused by either accidental spilling of the lye water solution through carelessness on the part of the service man or by the lye water's splashing from the receptacle, owing to the violent boiling which takes place through the chemical reaction when SO_2 comes in contact with caustic soda.

To prevent this hazard, the bucket which contains the lye water in which the refrigerant is to be discharged, should be of sufficient size to permit the sides to extend several inches above the lye water, thus minimizing the chances of the solution's boiling over. A pail, 8 or 10 inches in diameter by 18 or 20 inches high, and filled from one-half to two-thirds full of lye water, is recommended.

Pioneers

The pioneers in the business of automatic refrigeration were every bit as courageous as the brave men and women who first conquered and then settled this great land of ours.

By the expenditure of prodigious sums of money, plus time and effort, backed by unremitting research, automatic refrigeration was created and perfected. The pioneer in an industry must have vision as well as courage and cash.



During the entire period devoted to the development of the industry the facilities, experience and skill of Commonwealth Brass Corporation have aided in bringing the art of automatic refrigeration to its present status. Commonwealth has pioneered, too, in the field of Seepage-Proof Fittings.

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Detail of Float Valve Construction

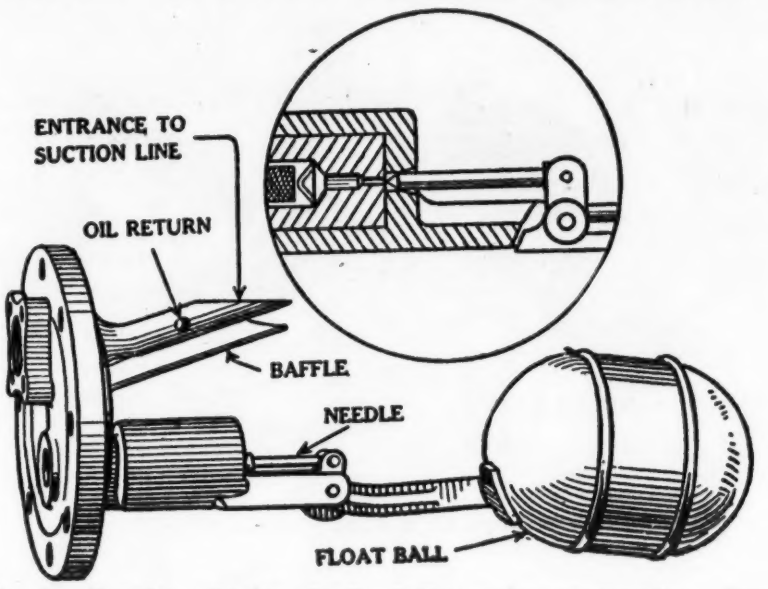

Fig. 86. Drawing showing detail of float valve construction. Insert shows how needle is constructed.

Servicing of Low Side Float Valves and Evaporators

(*Continued from Page 16, Column 5*)

exists it becomes necessary to connect an empty refrigerant cylinder to the discharge side of the system to accept the overcharge of liquid. This empty cylinder and all connections should be tested for leaks, then inverted (placed upside down), with the inlet at the bottom of a tall pail of cold or ice water.

The refrigerant being pumped into the cylinder with this arrangement will readily condense under normal pressure, whereas the pressure may become excessive if the bottom of the cylinder is placed in the water or in the open room.

The refrigerant charge in a low side float system is not critical. A slight overcharge will not materially affect the operation. However, if the evaporator is frosting completely and the low side pressure is normal, an addition of refrigerant is not desired.

Any refrigerant in the system in excess of the normal charge will take up valuable space in the liquid receiver, and possibly the condenser, which is needed for the compressed gasses. The more of this space taken up with an overcharge, the higher the operating head pressure.

Often in purging air from a system, it is impossible to return the pressure to normal. This condition may be due to an overloaded liquid receiver. A very simple but dependable test is to play the flame of a blow torch up and down, either on the horizontal or vertical receiver in a very direct path. The receiver will become hot very rapidly above the liquid level, while the surface below the liquid level will remain cooler by absorbing the heat of the flame.

The actual level is thus determined. By following the rule of using one-third of the receiver for liquid and the remaining two-thirds for compressed gas, normal head pressures may be obtained. It is considered good policy to remove any excess refrigerant from the system.

The low side float flooded system may be used in multiple very successfully. It may also be used with either the low pressure control or the thermostatic control. The low pressure control generally being used when the evaporators are in multiple, while either the low pressure control or the thermostatic control is used on individual units.

Evaporators for use with the low side float may vary in appearance and construction, but they all serve the same purpose and may be readily identified by the cylinder or header to which the tubes are attached and which houses the float mechanism.

The Frigidaire evaporator illustrated in Fig. 84 is typical of Frigidaire construction, that is, the copper tubes are silver soldered into the brass header. (C) A forged brass boiler is soldered into the front of the header (D) this ring is tapped to receive the cap screws (B). This ring is recessed (E) to receive the lead gasket (D).

The float valve mechanism is mounted on the float header (see Figs. 85 and 86. The float header has an extending pilot, which when pulled up into place by the cap screw, results in a gas tight joint at E (Fig. 84). When the cap screws are removed, the entire float assembly may be removed from the evaporator. Note the suction return tube and the oil overflow hole in Fig. 85.

Suction line shut-off service valve G (Fig. 84) is held into place by four cap screws and the gasket joint is the same type as on the header proper.

Liquid line shut-off service valve F is screwed into the float valve header. There is a fine wire mesh screen strainer between the valve F and the float valve orifice (see Fig. 86). This strainer may be removed for replacing or cleaning only by first evacuating the entire evaporator and removing suction valve G and liquid valve F.

Liquid line valve F is also fitted with an outside strainer which may be removed by evacuating the liquid line. The valves are equipped with seal plugs or caps to prevent refrigerant leaks through the packing gland from leaving the system.

Float valves used by other manufacturers have practically the same principle. The Zerozone float valve is illustrated in Fig. 87. It is slightly different in several respects. Both the suction and liquid valves are screwed into the float valve header.

The liquid line valve being on a slight angle, so that it may be revolved for screwing in or out of the header. The liquid valve must be removed from the assembly first, before the suction valve may be completely revolved for removing.

The Zerozone float employs the entire surface of the brass header ring for gasket surface thus using a larger or wider gasket, perforated for the cap screw holes. This feature is found in several other makes.

A Kelvinator float valve assembly is illustrated in Fig. 88. Note that it does not have a return tube for the vapor and oil, as this feature is accomplished by the ports in the face plate header.

Certain models of Kelvinator float valves are equipped with liquid and suction valves. These valves are of the two-bolt flanged type using the pad type of gasket.

A slightly different principle is employed in the Servel flooded-type evaporator illustrated in Figs. 89 and 90. With this design, the liquid entering the opening at the float needle is first passed in the tube marked inlet to evaporator. This tube is wound around the ice cube tray sleeves.

When the liquid has circulated through this entire continuous tube coil, it is then admitted to the rear of the evaporator at the point marked inlet to float shell. The liquid enters at this point, controlling the liquid level in the float chamber.

The refrigerant vapors are then passed into the vaporizing coil which is connected to the top of the float shell. The vaporizing coil is actually the last three tubes of the evaporator. From the vaporizing coil, the heat laden vapor is passed into the suction line thence to the compressor.

Note that the evaporator is not equipped with shut-off service valves. It is necessary to control the refrigerant in servicing with the service shut-off valves on the condensing unit. The float inlet and inlet to the evaporator is equipped with screen-type strainers. This part of the assembly may be removed separately by first pumping the refrigerant from the evaporator and removing the slotted head screws.

The entire float assembly may be removed from the evaporator by removing the hex head cap screws from the header proper. The same general rules, as to shortage of refrigerant, leaky floats, etc., apply to this type as do they to the other low side floats described.

Fig. 91 shows the Fedders bucket float assembly, which operates under the same general principles as the ball type float, and also employs an open pan which floats in the liquid maintaining the correct liquid level.

This design differs largely in that any oil slopped over by the boiling action of the refrigerant or that flows into the pan due to an excessive level of oil is immediately drawn with the return vapors up the suction return tube which has its only opening at the bottom of the pan.

The construction of this float and header assembly is such that the float is not removable from the header, being spun and soldered into place.

The needle and seat assembly, known as the cartridge type needle-seat assembly, illustrated in Fig. 92, is removable by evacuating the evaporator, removing the two-bolt flange-type liquid valve or liquid line connections and unscrewing the needle-seat assembly from the header with a special hex-end socket wrench.

The needle-seat assembly may be replaced with a new one. When the assembly is being tightened into the header, the head of the needle will snap into place in the spring clips attached to the float mechanism. After this click or snapping noise is noticed, the assembly should be tightened carefully until it is snug against the shoulder.

A screen-type strainer is located between the needle-seat assembly and the liquid inlet connection. A lead gasket is used to effect a gas-tight joint between the header and the liquid line connection.

The spun-in non-removable header is used with the ball-type float by

(*Concluded on Page 18, Column 3*)

Zerozone Float Valve

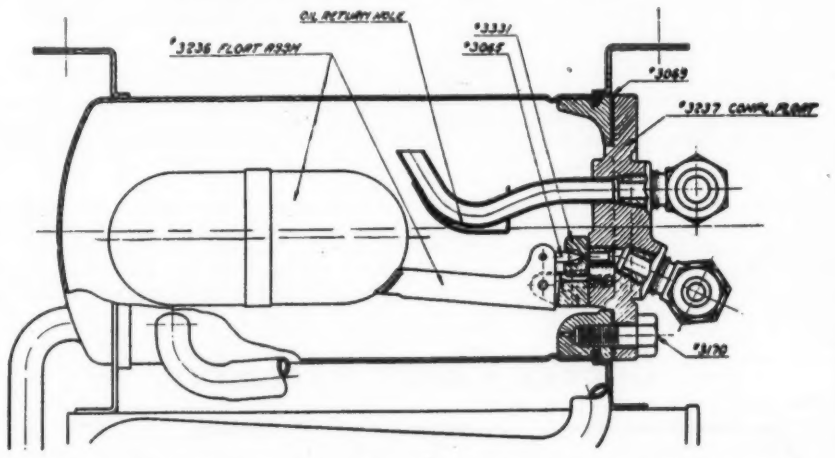

Fig. 87. Zerozone float valve showing how the suction and liquid valves are screwed into the float valve header,

Kelvinator Low Side Float

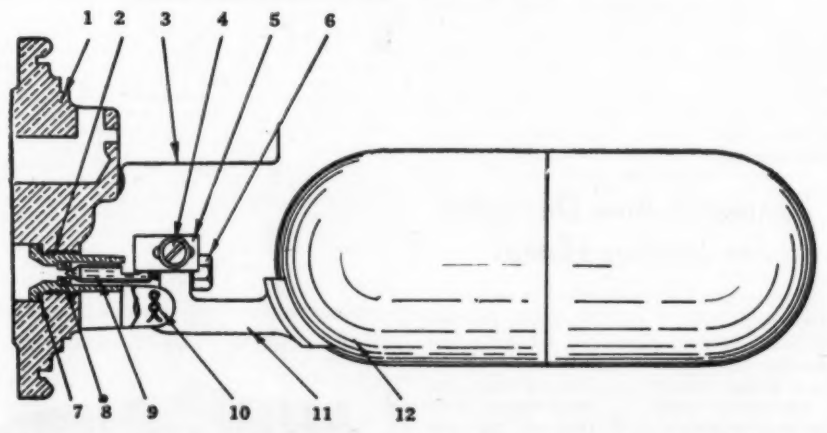

Fig. 88. Kelvinator low side float valve with parts numbered as follows: (1) Face plate; (2) Valve cage; (3) Baffle; (4) Valve pull-back screw; (5) Valve pull-back; (6) Adjusting screw; (7) Valve cage basket; (8) Valve seat; (9) Valve needle.

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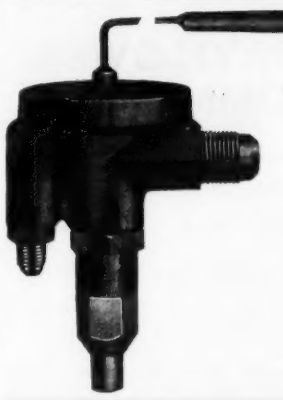

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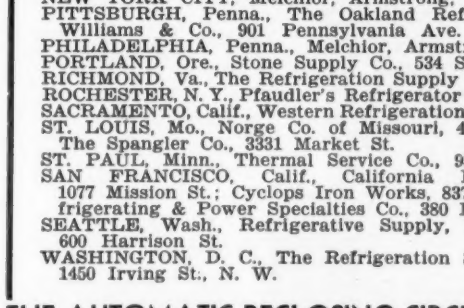

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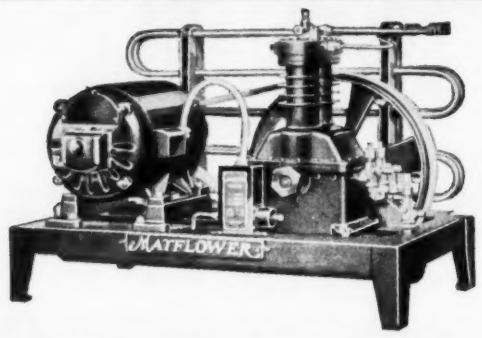

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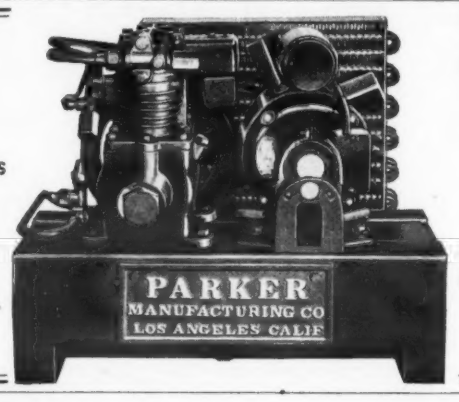

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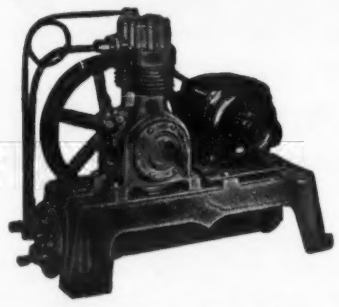

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Servicing of Flooded Evaporators

(*Concluded from Page 17, Column 3*)

some manufacturers. This feature eliminates the possibility of replacing the float valve or needle and seat assembly on the job. In the case of a leaky float, the entire evaporator is replaced by the service man, and the defective one returned to the factory or reconditioned at a district service shop equipped to do such work.

Some manufacturers have discontinued the use of liquid and suction shut-off service valves on the evaporators. Where this practice is followed, the liquid and suction line connections are either of the flared tube or solder-type connectors or elbows.

Replacement floats are often equipped with the shut-off valves, while others depend entirely upon the condensing unit service valve to control the refrigerant while servicing.

Proper calibration of the float valve assembly is very important as the weight of the float is such that it floats in the liquid refrigerant and is only slightly effected by the oil.

On the non-adjustable ball-type floats, the float arm from the ball to the pivot connection on the header is so shaped that the proper calibration is obtained. Often through wear at the needle and seat or vibration or for some other reason, the float may get out of calibration, that is the ball may be held slightly lower than normal and a lower liquid level will be maintained.

This results in a thicker blanket of oil in the case of an SO_2 system. This thicker or excessive blanket of oil will increase the boiling point of the liquid as an intermediate pressure is formed between the oil and the liquid.

If the case is extreme, some of the oil may find its way down into the tubes and completely restrict the evaporating at that point. The part of the evaporator effected by this excessive oil may defrost. This condition is known as an oil-logged or oil-bound evaporator.

As a temporary relief, heat may be applied to the evaporator at the point that is not frosting. This heat will increase the pressure in this area and may cause the refrigerant to break through the oil and start normal evaporation. When this oil is breaking loose, a loud thumping noise will be noticed in the evaporator and the pressure in the low side will jump rapidly.

This method may be considered only temporary as most cases of oil logging are directly traceable to a float valve out of calibration. To permanently correct the condition, the float valve should be replaced with one that is correctly calibrated. The refrigerant charge should be checked after replacing the float, as additional refrigerant will be required in the float chamber because the level will be higher with the corrected float.

The oil level in the crankcase of the compressor should also be checked carefully as the excessive oil found in the evaporator causing the oil logging condition may have come from the crankcase and it may be short.

Methyl chloride used in the flooded system presents an entirely different problem. The oil in the evaporator does not necessarily distill or separate from the refrigerant, hence no definite blanket of oil is formed. As oil mixes with methyl chloride in most all quantities, an oil logged methyl chloride evaporator may be the result of an overcharge of oil.

As the oil goes into solution with the methyl chloride, the solution may have too large a percentage of oil, which raises the boiling point of the methyl and hinders its proper boiling action.

Oil that is too light may also mix too freely with the refrigerant and increase the percentage of oil in the refrigerant, resulting in abnormal evaporation. Oil that is too heavy may also cause evaporation troubles as it tends to thicken in the cold evaporator.

To function correctly, the flooded evaporator must be level. If the evaporator slopes to the front, liquid may overflow down the suction return tube. If the evaporator is sloped to the back, the evaporator may not receive the correct amount of liquid refrigerant.

Servel Float-Valve Assembly

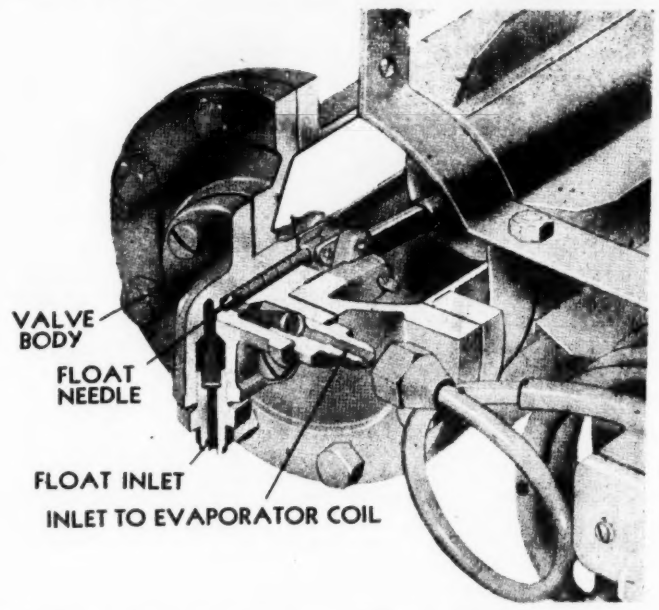

Fig. 89. Float needle valve assembly. With this design, the liquid entering the opening at the float needle is first passed in the tube marked inlet to the evaporator. This system was used by Servel.

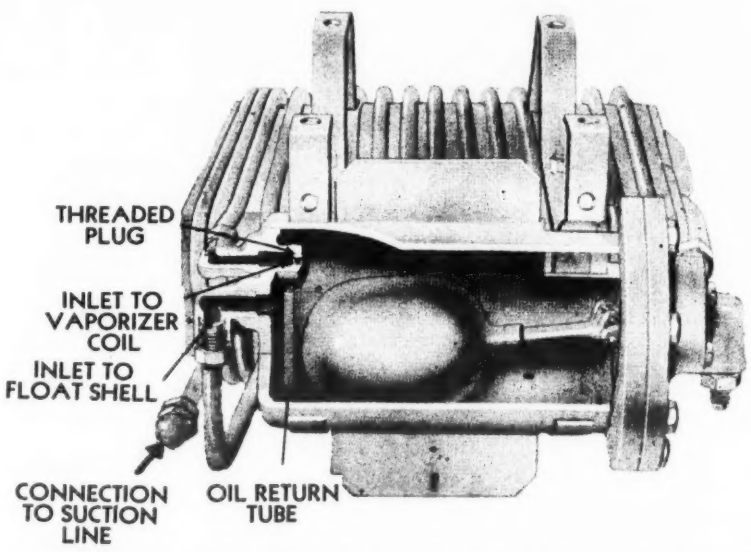

Fig. 90. Shell and liquid return device, showing inlet to vaporizer coil.

Bucket Float Assembly

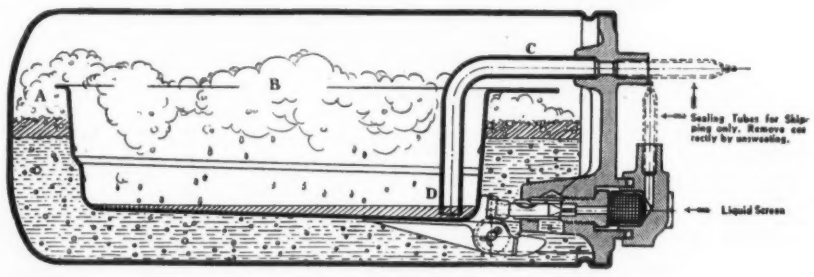

Fig. 91. Fedders bucket float assembly, showing the open pan which floats in the liquid maintaining the correct liquid level.

Needle & Seat

Fig. 92. Cartridge-type needle and seat assembly for bucket float.

Imperial Brass Issues New Book Showing Parts & Supplies

CHICAGO—Latest edition of the refrigeration catalog of the Imperial Brass Mfg. Co., just off the press, is in two colors, with valves, fittings, and service tools grouped for quick reference, and with a number of new items added to each group.

Among these is the new Imperial charging and testing unit, which has a variety of uses. Valves in this unit are the Imperial "Sylpak," which, it is claimed, will withstand an extreme degree of oscillation, without injury to the sylphon.

The flexible charging line has been made more adaptable, and is equipped, when required, with replaceable copper extensions.

Wacker Promoted

BROOKLYN—E. D. Wacker has been appointed assistant general sales manager of the C. J. Tagliabue Mfg. Co., manufacturer of indicating, recording, and controlling instruments. R. A. Skinner succeeds Mr. Wacker as division sales manager in charge of Snapon controller sales for domestic refrigerators.

Tempered-Aire Designed For Smaller Homes

DETROIT—A smaller Tempered-Aire unit, model 102, designed for use in the average home of six or seven rooms has just been introduced by Gar Wood Industries, Inc. of this city.

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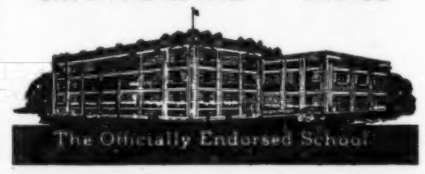

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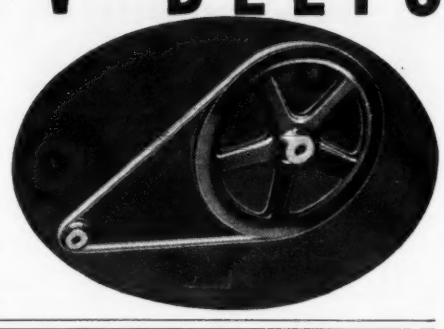

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QUESTIONS

'Handy' Tube Bender

No. 2308 (Serviceman, New York)—"Kindly send to me the manufacturer's name and address who handles the 'Handy Mechanical' tube bender as referred to in the installations operations lesson number 6 of the May 22 issue."

Answer: Manufactured by Holsclaw Bros., Inc., 317 Goodsell St., Evansville, Ind.

Finance Companies

No. 2309 (Dealer, North Carolina)—"Will you be so kind to send us the names of the different finance companies that finance refrigerators?

"We know that there are several and we will certainly appreciate it if you will send us the names and addresses of them."

Answer: Finance companies which handle paper for electric refrigerators are listed on page 350 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

Capacity of Servel Model

No. 2310 (Reader, New York)—"I am interested in a Servel refrigerator. Kindly tell me the capacity of the Servel 5-EW, whether it is a ¾ hp. or a ½ hp."

Answer: We have searched through our specifications which we have published for the last three years, but can find no Servel unit with this model number. Model 50-DW is the closest to this designation, and it is a ½-hp. unit.

Refrigerator Makers

No. 2311 (Manufacturer, Michigan)—"We are very desirous of securing a list of refrigerator manufacturers and have been referred to you by the McGraw-Hill Publishing Co. of New York. If you have such a list, we would greatly appreciate receiving a copy."

Answer: Manufacturers of household electric refrigerators are listed on pages 235 and 248 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

Absorption Systems

No. 2312 (Dealer, Pennsylvania)—"We would appreciate it very much if you could furnish us with the details of construction, principle, and operation of the electric refrigeration system which utilizes the application of heat by means of a gas flame such as incorporated in the Electrolux or the Crosley Icy Ball.

"We understand that the refrigeradium is anhydrous ammonia. Thank you for any information that you can give us regarding this apparatus."

Answer: See below.

No. 2313 (Student, California)—"I received information from an Electrolux agent that you had some reference on the new Electrolux air-cooled refrigeration system. Would you be so kind as to send me a little information on the machine showing me its operation and other principles about it?"

Answer: A story describing the Electrolux air-cooled refrigeration system was published in the March 29 issue of ELECTRIC REFRIGERATION NEWS.

An article by B. H. Jennings of Lehigh University on "New Data on Absorption Refrigeration" was published on page 17 of the May 29, 1935 issue of ELECTRIC REFRIGERATION NEWS.

1935 Market Data

No. 2314 (Newspaper, Kentucky)—"I note in the April 30 bulletin released by the U. S. Department of Commerce that you have a REFRIGERATION AND AIR CONDITIONING DIRECTORY of 1935. I am not interested in volume one which deals with a list of names and addresses of the manufacturers. I understand you have volume two which contains market data. Is this market data broken down by cities and towns as well as counties?

"Would you kindly send me complete details as to the type and extent of this market data together with the cost of his book?"

Answer: The 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK contains all available statistical information and market data concerning the refrigeration and air-conditioning industries.

Included are tabulations showing sales of household electric refrigerators by months for past years, refrigerator sales by states, exports of refrigeration equipment, wired homes, and potential markets for U. S. cities, sales of various types of commercial refrigeration applications.

The MARKET DATA BOOK also contains a record of air-conditioning installations in 30 leading American cities, and number of installations on American railway lines.

All told, the book contains 304 pages of material, including a review of electric refrigeration industry development and a summary of events during 1934. Price is $3.00 per copy.

Coin Meters

No. 2315 (Dealer, Iowa)—"Please give us information where we can purchase refrigerator clock meters (twenty-five cents a day)."

Answer: Manufacturers of coin meters for use in connection with electric refrigerators are listed on page 253 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

State Saturation

No. 2316 (Manufacturer, Ohio)—"Can you give me the electric refrigerator saturation record for each of our forty-eight states? This record may be as of the first of the year or any other recent date most convenient. If your Statistical Department does not have this available, to whom may we go?"

Answer: No official estimate of electric refrigeration saturation for each of the 48 states has ever been made, nor do we know of any source from which this information may be obtained. However, we have compiled estimates of sales by states for all years since the beginning of the household refrigeration industry which may be of some service to you in this regard.

Bottle Coolers

No. 2317 (Dealer, Illinois)—"Occasionally we have persons calling in our store inquiring for a commercial refrigerator in which to keep soda and bottle beer. Most of these inquiries are from operators of taverns and restaurants.

"We will appreciate receiving a list of manufacturers who make this type of electric refrigerator."

Answer: Manufacturers of bottle beer coolers are listed on page 167 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY. Manufacturers of bottle beverage coolers are listed on page 171 of the same volume.

Lape's Address

No. 2318 (Dealer, New York)—"There is a Mr. Lape in the refrigeration business, I think at the present time conducting a school some place in New York.

"His name was mentioned in your publication a few months ago, but now I cannot find it. Possibly you cross index such information, and can give me Mr. Lape's address?"

Answer: E. S. Lape is secretary of the Master Refrigeration Association, 102 Fifth Ave., New York City.

Book Publisher

No. 2319 (Power Company, Ohio)—"Reference was made in your April 23 issue of ELECTRIC REFRIGERATION NEWS of a book called "Living with the Weather" published by the Caxton Publishing Co., Cleveland, Ohio.

"We have tried to purchase this book through the above company but our order has been returned marked—'address and company unknown.'

"Can you furnish us with the proper name and address by whom this book is published. Thank you for your cooperation.

Answer: Write the author, Dr. C. A. Mills, Professor of Experimental Medicine, University of Cincinnati, Cincinnati, Ohio.

Scope of Directory

No. 2320 (Engineer, Mississippi)—"I will ask that you forward me the scope and cost of the 1935 REFRIGERATION DIRECTORY AND MARKET DATA BOOK."

Answer: The 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY lists manufacturers of refrigeration and air-conditioning systems, parts, materials, supplies, and accessories. It also contains a section listing various service groups such as replacement part-jobbers and independent service companies.

The 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK, Volume 2, contains all available statistical and market data information concerning the refrigeration and air-conditioning industries.

Tubing Clamps

No. 2321 (Supplier, Ohio)—"We are eager to secure a source of supply on small clamps of a type to be used to support ¼-in. and ½-in. refrigeration tubing that are screwed or nailed to the walls or ceiling.

"Kindly advise us, and put us in touch with, someone who makes these articles. Please do not refer us to the 1935 DIRECTORY, as we happen to have one and cannot locate a source of supply for clamps in it."

Answer: Walway Co., 8737 Kercheval Ave., Detroit, Mich., makes these clamps.

Gurney & Century Units

No. 2322 (Manufacturer, Kansas)—"Please advise immediately the factory name and address of the manufacturer of Gurney and Century refrigerators."

Answer: We have no recent information with regard to the Gurney Refrigerator Co., Fond du Lac, Wis., but suggest writing to E. G. Vail at the National Refrigeration Manufacturers Association, 205 W. Wacker Drive, Chicago, Ill. Mr. Vail was formerly president of the Gurney Co. and could possibly give you the information which you desire.

We have no information regarding the Century Refrigerator and believe that it may possibly be a "private brand" unit manufactured under that name for some large distribution outlets.

CLASSIFIED

RATES: Fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

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DISTRIBUTORS and Dealers wanted to sell to the retail trade our nationally advertised brand new and A-1 reconditioned, remanufactured refrigerators. Exclusive territory for domestic and export trade open. When you deal with us you are assured of a ready supply of hundreds of refrigerators at greatly reduced prices. We carry the largest stock of nationally known makes, in all sizes. Every new or reconditioned refrigerator that leaves our block front plant is in A-1 condition. Every one bears our absolute guarantee which you can pass on to your customers in perfect confidence. Write for our booklet containing specifications and prices for domestic and export trade. When buying reconditioned refrigerators, for your protection, always look for our label, "Remanufactured by Federal Refrigerator Corp., 453 11th Ave., New York."

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